



# Apple IIc Owner's Manual



*Including Apple Presents The Apple IIc:  
An Interactive Owner's Guide and System Utilities.*

## **Free Replacement**

If you purchase Apple software or manuals that have physical defects, or even if you damage them yourself, Apple will replace them at no cost to you. This offer is good for two years after the last date that Apple continues to sell that product to its dealers. See your local authorized Apple dealer for details about the Apple Media Exchange Program.

## **Limitation on Warranties and Liability**

Even though Apple has tested this manual and software and has reviewed their contents, neither Apple nor its suppliers make any warranty or representation, either express or implied, with respect to this manual or software, their quality, performance, merchantability, or fitness for any particular purpose. As a result, this manual and software are sold "as is," and you the purchaser are assuming the entire risk as to their quality and performance. In no event will Apple or its suppliers be liable for direct, indirect, incidental, or consequential damages resulting from any defect in the manual, even if they have been advised of the possibility of such damages. In particular, they shall have no liability for any programs or data stored in or used with Apple products, including the costs of recovering or reproducing these programs or data.

## **Copyright**

This manual and the accompanying software (computer programs) are copyrighted by Apple or by Apple's suppliers, with all rights reserved. Under the copyright laws, this manual and software may not be copied, in whole or in part, without the written consent of Apple, except in the normal use of the software or to make a backup copy. This exception does not allow copies to be made for others, whether or not sold, but all of the material purchased (with all backup copies) may be sold, given, or lent to another person. Under the law, copying includes translating into another language.

You may use the software on any computer owned by you, but extra copies cannot be made for this purpose. For some products, a multi-use license may be purchased to allow the software to be used on more than one computer owned by the purchaser, including a shared-disk system. Contact your authorized Apple dealer for information on multi-use licenses.

© Apple Computer, Inc., 1984  
20525 Mariani Avenue  
Cupertino, California 95014

Apple, the Apple Logo, Imagewriter, and ProDOS are trademarks of Apple Computer, Inc.

AppleCare is a service mark of Apple Computer, Inc.

Scribe is a registered trademark licensed to Apple Computer, Inc. by Unilogic, Ltd.

Simultaneously published in the United States and Canada.  
All rights reserved.

This revision of the *Apple IIc Owner's Manual* is dedicated to those Apple owners who used the Tell Apple Card in the back of their manuals to send us their ideas and suggestions.

In the Apple tradition, we listened to you, and learned from you. Thanks for your help in improving our products.

Keep those cards coming!





---

# Apple IIc Owner's Manual

Including *Apple Presents the Apple IIc:*  
*An Interactive Owner's Guide*  
and *System Utilities*

---



---

## Introducing the Owner's Manual

The *Apple IIc Owner's Manual* is really two books in one. The first book is an interactive owner's guide designed to give you a hands-on introduction to the Apple IIc. The second book is a guide to the *System Utilities* disk that came with your Apple IIc. Among other things, the utilities disk contains programs that let you copy disks, check the contents of disks, and prepare disks to receive your information.

### **What You Get**

Here's an overview of the topics covered in *Apple Presents the Apple IIc: An Interactive Owner's Guide*:

- introduction to the keyboard
- how to start and stop a program
- application programs—word processing, spreadsheet, data base
- how programs are loaded into memory
- how information is stored in memory
- how information is saved on disks
- elementary programming in BASIC and Logo
- peripheral devices (printers, modems, mouse, monitor, joystick)
- troubleshooting tips



Here's a list of the topics covered in the *System Utilities* booklet:

- copying files
- deleting files
- renaming files
- locking and unlocking files
- duplicating (copying) a disk
- formatting (preparing) a disk
- identifying or cataloging a disk
- setting up the Apple IIc to communicate with printers and modems

Each section has its own table of contents, but the glossary and the index at the back of the *Owner's Manual* apply to both the *Interactive Owner's Guide* and the *System Utilities* section.

**Two Books In One:** Earlier versions of *Apple Presents the Apple IIc: An Interactive Owner's Guide* and *System Utilities* were published under separate covers, but the content was virtually identical to what you'll find in the *Apple IIc Owner's Manual*.

### **Dig In**

Okay, now dig in and enjoy your introduction to the Apple IIc, then do us a favor. Take a few minutes to fill out the Tell Apple form at the back of the manual. We want to be sure that we're giving you the information you need to get up and running quickly and productively. Let us know what you liked about the manual, and what you'd like us to do differently. Thanks.



---

# Apple Presents the Apple IIc

## An Interactive Owner's Guide

---





---

# Contents

## PREFACE

Figures and Tables

viii

Radio and Television Interference

xi

Welcome to Apple

xiii

What You'll Learn

xiii

How You'll Learn

xiii

Who Should Read It

xiv

How It Works

xv

## CHAPTER 1

Meet Your Apple IIc

1

The Cast of Characters

2

Computer Programs

4

Input and Output

4

Handle With Care

5

Putting a Disk in a Disk Drive

5

Hands On—*An Introduction*

9

Got a Problem?

9

More About the Apple IIc

10

The Cursor

10

The Keyboard

11

Lights and Switches

14

What Now?	17
Starting Up	17
Starting Up With the Power On	18
Stopping the Computer	19
Hands On— <i>The Apple at Play</i>	20
Disks	22
Disk Capacity	23
Care of Disks	24
Chapter 1 Summary	26

## CHAPTER 2

Putting the Apple IIc to Work	27
Hands On— <i>The Apple at Work</i>	28
Application Programs	29
Popular Programs	30
Things You Can Do With Your Apple IIc	33
Communication	33
Data Base	33
Education	34
Games	34
Graphics	34
Home Finance	35
Specialty Programs	35
Spreadsheet	35
Word Processing	35
What Now?	36
Chapter 2 Summary	36



## CHAPTER 3

The Inside Story	37
Hands On— <i>The Inside Story</i>	38
Meet the Players	38
How It Works	40
Starting Up	40
Creating Information	41
Saving Information on a Disk	44
Filenames	46
Retrieving Information From a Disk	46
Putting It All Together	47
Operating Systems	48
Chapter 3 Summary	50

## CHAPTER 4

Programming	51
Why Program?	52
Why Not Program?	52
Learning to Program	53
Logo	53
Hands On— <i>Exploring Apple Logo</i>	54
Logo Revisited	54
BASIC	54
Hands On— <i>Getting Down to BASIC</i>	55
Getting Down to BASIC	55
Getting Into BASIC	55
Printing Numbers and Doing Calculations	55
Moving On	56

Printing Words	57
Moving On	57
Writing Programs	57
Moving On	58
Variables and INPUT Statements	59
The LET Statement	61
The INPUT Statement	61
Getting Your Program Onto a Disk (and Off Again)	62
Formatting	62
Formatting a Disk for BASIC Programs	62
Getting Into Applesoft BASIC	63
Saving a BASIC Program	63
Naming Programs	64
Running a Program	64
Cataloging Disks	64
Deleting Programs	66
Creating a Self-Starting Program	67
It's Your Turn	67
Converting Miles to Kilometers	68
Crazy Sentences	69
Printing Your Programs on Paper	71
You've Only Begun to Program	72
Other Computer Languages	72
Bits and Bytes	74
Chapter 4 Summary	75



## CHAPTER 5

### Now What?

Choosing Application Programs 78

Users Groups 79

Computer Magazines 79

Computer Books 79

Adding Pieces to Your Computer System 79

Peripheral Devices 81

Monitor or Television Set 81

Printer 84

Plotter 85

Second Disk Drive 85

Mouse 85

Modem 86

Joystick or Hand Controls 86

You're Not Alone 86

You Can Take It With You 87

Chapter 5 Summary 88

77

## APPENDIX A

### Ask Apple

89

## APPENDIX B

### Troubleshooting

General Troubleshooting Tips 100

Stopping a Runaway Program 101

Programs That Won't Start Automatically 101

97

## APPENDIX C

Apple II Family Differences	103
Memory Capacity	106
Additional Features	106
Keyboard	107

## APPENDIX D

Apple IIc Specifications	109
Standard Features	110
Languages Available From Apple	110
Operating Systems Available	111
Popular Accessories	111

## APPENDIX E

Guide to Service and Support	113
Service	114
Support	115
AppleCare	115

Glossary	G-1
----------	-----

Index	I-1
-------	-----

Tell Apple Card	
-----------------	--



## Figures and Tables

### PREFACE

Welcome to Apple

xiii

Figure P-1 Disk/Book Symbols xv

### CHAPTER 1

Meet Your Apple IIc

1

Figure 1-1 The Apple IIc 2

Figure 1-2 The Apple IIc Computer System 3

Figure 1-3 Flexible Disks 4

Figure 1-4 Open the Disk Drive 5

Figure 1-5 Put the Disk in the Disk Drive 5

Figure 1-6 Close the Disk Drive 6

Figure 1-7 Turn On Your Monitor or Your Television Set 6

Figure 1-8 Turn On the Power 6

Figure 1-9 Starting Up 7

Figure 1-10 The Opening of *An Introduction* 8

Figure 1-11 The Three Cursors 10

Figure 1-12 The Keyboard of the Apple IIc. The special keys are highlighted. 12

Figure 1-13 Lights and Switches 14

Figure 1-14 The Standard Keyboard and the Dvorak (Simplified) Keyboard 16

Figure 1-15 Starting Up With the Power Off 18

Figure 1-16 Starting Up With the Power On 19

Figure 1-17 *The Apple at Play* Menu 21

Figure 1-18 A Flexible Disk 22

Figure 1-19 Cover the Notch With a Write-Protect Tab 23

Figure 1-20 Do's and Don'ts of Disk Care 24

## CHAPTER 2

### Putting the Apple IIc to Work 27

Figure 2-1 Word Processing Display 30

Figure 2-2 Data Base Display 31

Figure 2-3 Spreadsheet Display 32

## CHAPTER 3

### The Inside Story 37

Figure 3-1 Main Logic Board 39

Figure 3-2 Close-Up of Chips 39

Figure 3-3 Starting Up. Once the operating system is in memory, it loads the application program. 41

Figure 3-4 Your Information Is Kept in Memory, Too 42

Figure 3-5 Memory Is Temporary 43

Figure 3-6 Scrolling 44

Figure 3-7 Saving Information in a File on a Disk 45

Figure 3-8 Loading the Contents of a File Into Memory 47

Figure 3-9 Using an Application Program 48

Figure 3-10 Separate Disk Holders for Different Programs 49

Figure 3-11 Label Data Disks With the Operating System 49

## CHAPTER 4

### Programming 51

Figure 4-1 Logo Art 54

Figure 4-2 Anatomy of a LET Statement 61

Figure 4-3 A Typical Catalog 65

Figure 4-4 Language Hierarchy 74

Figure 4-5 Eight Bits in a Byte 74

## CHAPTER 5

### Now What?

77

Table 5-1	Adding Pieces to Your Computer System	80
Figure 5-1a	40-Column Display Versus 80-Column Display. This is a 40-column display.	82
Figure 5-1b	40-Column Display Versus 80-Column Display. This is an 80-column display.	83
Figure 5-2	The Apple Imagewriter	84
Figure 5-3	The Apple Color Plotter	85
Figure 5-4	Disk Drive	85
Figure 5-5	The Apple Mouse	85
Figure 5-6	Modem	86
Figure 5-7	Hand Controls and Joystick	86

## APPENDIX B

### Troubleshooting

97

Figure B-1	A Typical Catalog	102
------------	-------------------	-----

## APPENDIX C

### Apple II Family Differences

103

Figure C-1	Apple II Family Differences	104
------------	-----------------------------	-----



## Radio and Television Interference

---

The equipment described in this manual generates and uses radio-frequency energy. If it is not installed and used properly—that is, in strict accordance with our instructions—it may cause interference with radio and television reception.

This equipment has been tested and complies with the limits for a Class B computing device in accordance with the specifications in Subpart J, Part 15, of FCC rules. These rules are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that the interference will not occur in a particular installation, especially if a “rabbit ear” television antenna is used. (A “rabbit ear” antenna is the telescoping-rod type usually contained on television receivers.)

You can determine whether your computer is causing interference by turning it off. If the interference stops, it was probably caused by the computer or its peripherals. To further isolate the problem, disconnect the peripheral devices and their input/output cables one at a time. If the interference stops, it was caused by either the peripheral device or the I/O cable. These devices usually require shielded I/O cables. For Apple peripherals, you can obtain the proper shielded cable from your dealer. For non-Apple peripheral devices, contact the manufacturer or dealer for assistance.

If your computer does cause interference to radio or television reception, you can try to correct the interference by using one or more of the following measures:

- Turn the television or radio antenna until the interference stops.
- Move the computer to one side or the other of the television or radio.
- Move the computer farther away from the television or radio.
- Plug the computer into an outlet that is on a different circuit than the television or radio. (That is, make certain the computer and the radio or television set are on circuits controlled by different circuit breakers or fuses.)
- Consider installing a rooftop television antenna with coaxial cable lead-in between the antenna and television.

If necessary, you should consult your Apple-authorized dealer or an experienced radio/television technician for additional suggestions. You may find helpful the following booklet, prepared by the Federal Communications Commission:

*How to Identify and Resolve Radio-TV Interference Problems.*

This booklet is available from the U.S. Government Printing Office, Washington, DC 20402, Stock Number 004-000-00345-4.

---

## Preface

---

## Welcome to Apple

When you chose an Apple® IIc, you chose more than a machine. You chose a philosophy—that using a computer is fun. Sure, you can use your Apple IIc for all sorts of serious purposes, from balancing your books to tracking your investments, but there's no reason why you can't enjoy yourself while you're at it.

Learning to use a computer should be part of the fun—and it *is* fun, with the *Interactive Owner's Guide*, a hands-on introduction to the Apple IIc.

---

### What You'll Learn

This hands-on guide will help you get comfortable with your Apple IIc. The guide will

- introduce you to the fundamentals of using the computer
- demonstrate some of the things you can do with your computer—like writing letters and balancing your budget
- introduce you to programming—the fine art of talking to the computer in its own language.

The guide won't teach you how to set up your computer, so read *Setting Up Your Apple IIc* before you read this book.

---

### How You'll Learn

This guide has a unique way of teaching you about the Apple IIc. You learn by interacting with the computer—that's why it's called an interactive guide. The instructions that turn your Apple IIc into a

An *Interactive Guide* combines book, disk, and computer for personal instruction.



private tutor are recorded on the disks that came with this guide. The book is a bridge between topics covered on the disks and a reference to what you see on the screen, but most of your learning will come from hands-on experience.

Go through the guide at your own pace. Learning with a computer is different from learning in a classroom—you don't have to wait for a bell to take recess. And don't feel that you have to master everything in one pass. The guide won't self destruct after the first go-around. You can go through it until you're comfortable with the material and then come back to it any time you need a refresher course.

### Who Should Read It

---

This book is designed primarily for newcomers to the Apple II family of computers. If you're a first-time user, chase any veterans out of the room so you can go through the book and disks alone. It's a personal computer after all, and learning to use it should be a personal experience.

If you've used other models of the Apple II, a lot of what you know will apply to the Apple IIc. If you decide to skim through the book, use the summaries at the end of each chapter to make sure you haven't missed anything. Even experienced users will find this guide helpful. If you're one of these people:

- Go through *Apple Presents the Apple IIc: An Introduction*.
- Read Appendix C, which describes differences between the Apple IIc and earlier models of the Apple II.
- Read the *System Utilities* Booklet that describes the utilities for the Apple IIc.

**Who Shouldn't Read It:** This book is not a technical reference manual. If you're looking for memory addressing maps, firmware listings, timing charts, and the like, ask your Apple dealer for the *Apple IIc Reference Manual*.

Once you've mastered the material in the guide, you'll be a competent, confident, full-fledged member of the Apple corps, but you won't know everything there is to know about computers.

Learning to use a computer is like learning to drive a car—your skill grows with your time behind the wheel. This guide will get you started; you'll learn about the brakes and the gas pedal, but you won't be ready for rush hour traffic. That comes with practice.

Where you go from here is up to you. You may decide to pick up another manual and learn to write programs. You may want to learn to use your computer for correspondence, budgeting, or keeping track of your jogging times and distances. One thing's for sure, your learning won't end with this book because there is no limit to what you can do with your Apple.

Whatever you do, relax and have a good time.

## How It Works

Figure P-1. Disk/Book Symbols



As you explore this guide, you'll come to the symbols shown in Figure P-1.

The first symbol means "go to the disk" for some hands-on experience. The second symbol means "return to the book" for a recap of what you learned on the disk and for related information.

Look for these other visual cues throughout the manual:

By the Way: Text set off in this manner presents sidelights or interesting pieces of information.

### Important!

Text set off in this manner—and with a tag in the margin—presents important information.

### Warning

Text set off like this indicates potential problems or disasters.

Computer jargon is boldfaced when it is introduced. Sometimes additional information about the term is in the margin; the term is always defined in the Glossary.

You will also see a special typeface used for what you type:

**It looks like this.**

Keys look like this: (←), (⌘), (RETURN). When you see a hyphen joining two keys, it means to press them simultaneously. For instance, (⌘)-(CONTROL)-(RESET) means all three keys should be pressed at the same time.

You'll also notice that some information is in italics and set apart from the rest of the text. This information is optional reading—it's related to the information in the main text, but it's not vital to your understanding.



## Chapter 1

## Meet Your Apple IIc



Sit down in front of your Apple IIc, and take a minute to identify the major parts that make up your computer (Figure 1-1).

Figure 1-1. The Apple IIc

**Volume Control Knob:**  
Lets you adjust the volume of the built-in speakers.

**Built-in Disk Drive:**  
Reads information from and writes information to disks, much the way a tape recorder plays and records music on a magnetic tape.

**Keyboard:** Your primary means of communicating with the computer.

**Ports:** Connectors for attaching a printer, and other accessories, to the Apple IIc.

**Handle:** For carrying the Apple IIc and for propping it up into a comfortable typing position.

**Important!**

Always prop the handle up under the Apple IIc when you are using the computer. It makes typing more comfortable and, more important, provides good air circulation around the computer.

## The Cast of Characters

Some peripheral devices are built into the computer—like the disk drive, the speaker, and the keyboard. Other devices can be attached to the computer by cable—like the printer.

A display device is the bridge between you and your computer. It *displays* information.

Figure 1-2 shows the Apple IIc with a variety of accessories, known as peripheral devices. While there are lots of devices you can use with your Apple IIc, for purposes of this guide, you need only two: the disk drive that's built into the computer and a video monitor or television set to use as a display device.

Figure 1-2. The Apple IIc Computer System

Video Monitor or  
Television Set (With RF  
Modulator): Displays what  
you type and messages  
from the computer.

External Disk Drive:  
Reads information from  
and writes information to  
disks, just like the  
built-in disk drive.

Computer: Processes the  
information you put into  
it.

Hand Controls and  
Joystick: Control  
movement of creatures or  
objects around the screen  
in some game programs.

Mouse: Moves a marker  
across the screen in some  
programs.

An RF Modulator  
makes it possible for  
a TV set to tune in  
signals from the  
computer.

Modem: Lets you  
communicate with other  
computers by phone.

Printer: Prints  
information from the  
computer on paper.

Plotter: Draws charts  
and graphs created with  
the computer on paper.





You'll learn more about printers, modems, and other devices you can hook up to your computer in Chapter 5.

## Computer Programs

---

What you do with your computer system depends on the programs (or instructions) that you put into it. Programs are stored on flexible disks, sometimes called floppy disks. (See Figure 1-3.)

Disks are to disk drives what tapes are to tape players. Some disks have information already recorded on them, others are completely blank (so you can use them to store your information).

The computer, the printer, and other devices are called **hardware**. Computer programs are called **software**.

Figure 1-3. Flexible Disks



---

### Input and Output

You may hear the terms *input* and *output* applied to devices. An input device is one that carries information into the computer (like the keyboard). An output device is one that carries information out of the computer (like the monitor). A disk drive is both an input and an output device because it loads programs into the

computer and it saves information from the computer to disks for storage.

Input and output is abbreviated I/O. If you see the message I/O ERROR on your screen, it means there was a problem with the exchange of information between the computer and one of the devices. You can usually guess what the problem is

based on what you were doing when the message appeared. If you were printing something, the problem is the connection between the computer and the printer. If you were loading something from or saving something to a disk, the problem is with the disk drive.

## Handle With Care

---

The Apple IIc isn't made of porcelain—so handle it with care, but not with kid gloves. You can't break it by pressing the wrong key. You also can't break it by typing too vigorously. But one thing the Apple IIc can't stand is immersion in coffee, soda, or chicken soup. If you have one rule in the computer room, make it this one: "No drinking on the job."

Your disks are the most fragile part of the computer system. The next section shows you the correct way to put a disk in the disk drive. You'll find further tips on disk handling in the section on disks later in this chapter.

## Putting a Disk in a Disk Drive

---

*An Introduction* is on the flip side of *The Apple at Play*.

Find the disk labeled *An Introduction*. This disk will introduce you to the special keys on the Apple IIc keyboard and to some concepts and procedures that are common to hundreds of other Apple II programs. It's a great way to get your feet wet.

Just follow these steps:

1. Push in on the built-in disk drive door, and it will pop up. See Figure 1-4. (If the cardboard packing material is still inside the drive, gently pull it out and throw it away. From now on, the only thing you should put inside your disk drive is a disk.)
2. Put *An Introduction* in the disk drive as shown in Figure 1-5. Make sure the correct label is facing up and that the oval cutout on the disk enters the disk drive first.

Figure 1-4. Open the Disk Drive



Figure 1-5. Put the Disk in the Disk Drive





3. When the disk is all the way inside the disk drive, push down on the door until it clicks shut. See Figure 1-6. This is important. If you forget to push down the door, the program won't run.

**Important!**

Make sure the disk is all the way inside the drive before you close the door—you can hear it click when it's in place. Then be sure to close the door completely.

4. Turn on your video monitor or television set. See Figure 1-7.

**Important!**

If you're using a television set, make sure the 80/40 Column switch on your Apple IIc (above the keyboard on the left) is set to 40 (the down position), that the channel selector on your television is set according to the instructions that came with your RF modulator (usually channel 3 or 4), and that the slide switch on the back of the modulator is *not* set to "Television," but to the "Computer" setting. (On some modulators, the "Computer" setting is referred to as the "Game" setting—a holdover from old times when RF modulators were used exclusively for video games.)

If you're using a monitor, make sure the 80/40 Column switch is set to 80 (the up position).

For more information, see "Lights and Switches" later in this chapter.

5. Reach around the left side of the computer and find the green switch in the lower-left corner. Press it to turn on the power of the Apple IIc. See Figure 1-8.

Figure 1-6. Close the Disk Drive



Figure 1-7. Turn On Your Monitor or Your Television Set



Figure 1-8. Turn On the Power





When you turn on the power, four things should happen:

- You'll hear a beep.
- The Power light (on the right above the keyboard) will light up.
- The Disk Use light (to the left of the Power light) will come on.
- You'll hear a whirring sound coming from your built-in disk drive.

Figure 1-9. Starting Up

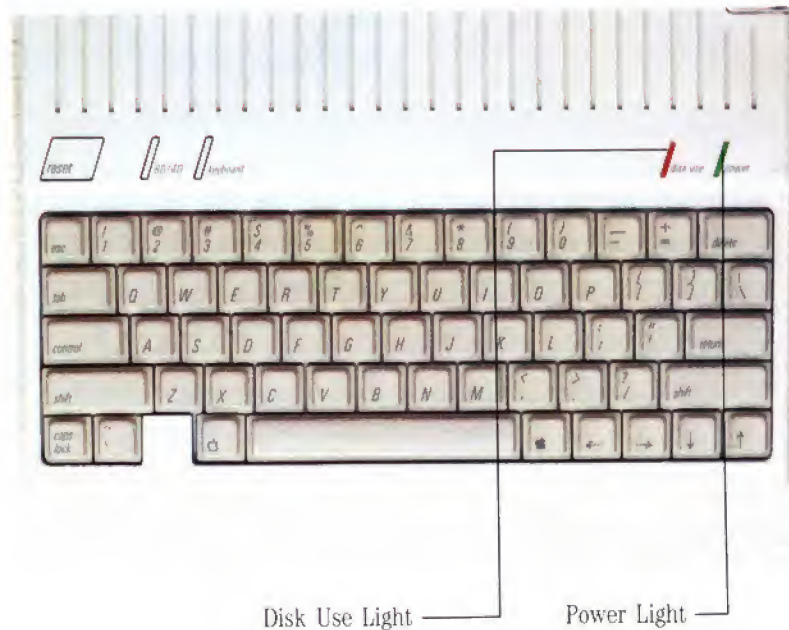
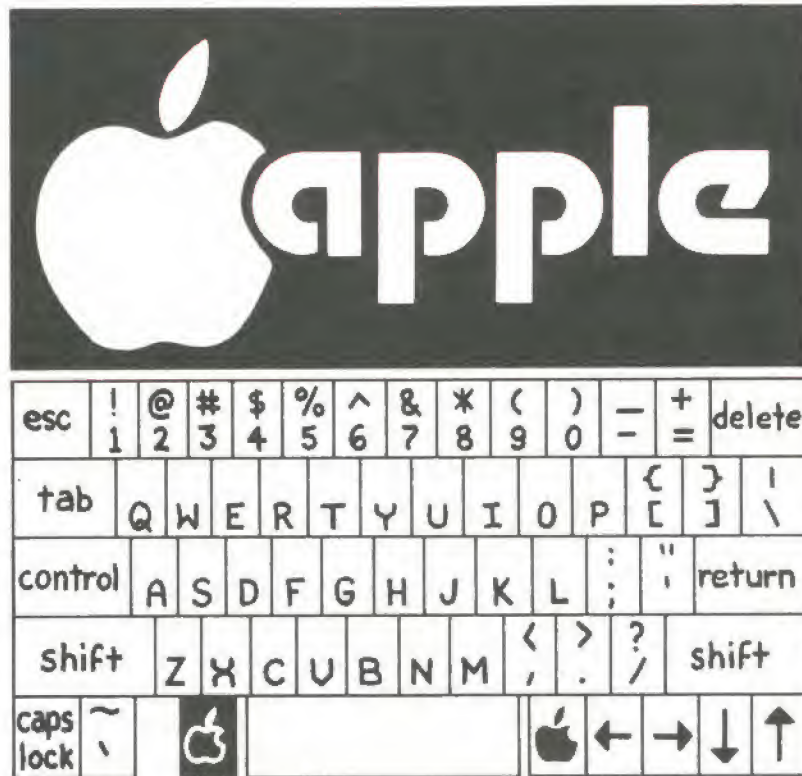


Figure 1-10. The Opening of *An Introduction*



Too Loud? Too Soft? If you don't hear any sounds or if the sound is too loud, adjust the volume control knob on the lower-left side of the Apple IIc.

Double-Sided Disks: Notice that information is recorded on both sides of the disks packed with this guide. These disks are certified for double-sided use. Most disks are designed for single-sided use (the disk drive uses only one side of the disk). Do not attempt to use both sides of a disk unless that disk is certified for double-sided use—most disks are not.

## Hands On—An Introduction



Put this book aside for a while and learn to use your Apple IIc by following the instructions on the screen. Mark your place so you remember to come back here when you're finished.

## Got A Problem?

If your screen doesn't look like Figure 1-10, do this:

- Check to make sure you have the right disk.
- Check to make sure the disk is right side up.

Then turn off the power and go back to "Putting a Disk in the Disk Drive."

If you don't see anything on the screen, do this:

- Make sure the monitor is turned on, plugged into the wall, and plugged into the computer.
- Try adjusting the monitor's contrast knob.
- If you're using a television, make sure the selector is set to the correct channel. Make sure the modulator is installed according to the instructions that came packed with it.

If you get the message **CHECK DISK DRIVE**, do this:

- Make sure the disk drive door is down. If it's not, push it down.
- If your disk drive door isn't the problem, you probably put the wrong disk in the disk drive or forgot to put any disk at all in the disk drive. Put in the correct disk.

Then turn off the power and go back to "Putting a Disk in the Disk Drive."



If you get the message **I/O ERROR**, do this:

- Slide the disk partially out of the disk drive and make sure it's the disk labeled *An Introduction* and that the oval cutout entered the disk drive first. If you had the wrong disk in the disk drive or if you had the correct disk inserted the wrong way, put the correct disk in the disk drive (oval cutout first), turn off the power, then turn it on again.

If these steps don't solve the problem, consult the troubleshooting appendix. If you can't find the answer there, contact your dealer.

## More About the Apple IIc

---



Welcome back. Take *An Introduction* out of the built-in disk drive and put it back in its paper envelope for safekeeping, but leave the Apple IIc turned on. You'll be using it again after this quick review.

### The Cursor

---

The cursor marks your place on the screen. It's usually a blinking underline, but it can also be a blinking or solid square. See Figure 1-11.

Figure 1-11. The Three Cursors

---



You move the cursor by using the arrow keys on the keyboard. What happens when you move the cursor depends on the program you're using. In some programs, moving the cursor to the left erases every character in the cursor's path. In other programs, the cursor moves over characters without erasing them. The quickest way to find out how a cursor works is to experiment by pressing **DELETE**, **←**, **→**, **↑**, and **↓**.

### **The Keyboard**

As you discovered in *An Introduction*, the Apple IIc keyboard is a little different from the keyboard on your run-of-the-mill typewriter. For one thing, it has got a bunch of keys that typewriters don't have. These keys are highlighted in Figure 1-12.

But even the keys that look like typewriter keys can behave differently. In some game programs, you might press letter keys to make your electronic quarterback throw a forward pass. It's up to the programmer to determine how the keys work. Fortunately, most programs follow certain rules.



When you press this key while holding down **CONTROL**, it causes some programs to restart (and you lose any data you were working with).

Pressing this key usually gets you back to the previous menu. *ESC* is short for *escape*.

Pressing this key by itself has no effect. It's used to make other keys work differently. When you see **CONTROL-G**, for example, the hyphen joining the two keys means to hold down **CONTROL** while you press **G**.

When this key is locked down, all the letters you type are capitalized, but no other keys are affected. So you can type uppercase letters and still type numbers.

Press this key to get uppercase letters and the upper character on two-character keys. It works just like the typewriter shift key.

Press the **SPACE** bar to insert space characters. That's right, to the computer a space is a character.

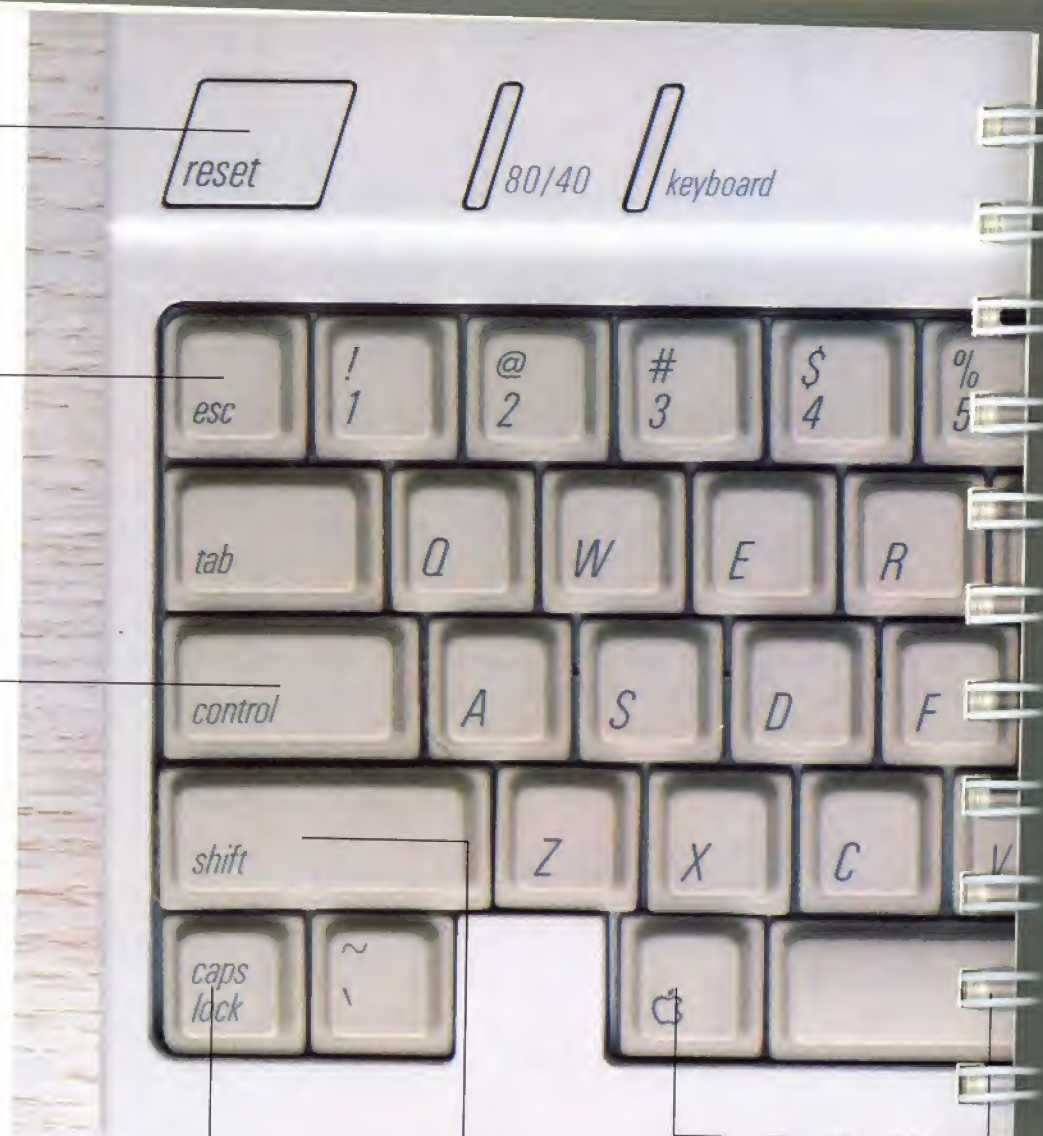




Figure 1-12. The Keyboard of the Apple IIc. The special keys are highlighted.



 *disk use*  *power*



The Open-Apple and Solid-Apple keys make other keys work differently (like **CONTROL**).

Typists sometimes use the letters *L* and *O* interchangeably with the numbers *I* and *O*. You can't do that on a computer.

The arrow keys move the cursor around the screen.

Pressing this key means you've finished typing something or that you're ready to proceed.

Some programs use this key to erase characters to the left of the cursor.

## Lights and Switches

Figure 1-13. Lights and Switches



You should also be aware of the switches and lights located just above the keyboard. Figure 1-13 shows the Power light, the Disk Use light, the 80/40 Column switch, and the Keyboard switch.

- The Power light is on when the computer's power is on.  
Make sure the Power light is off before plugging any devices into the computer.
- The Disk Use light comes on when the built-in disk drive is reading information from a disk or writing information on a disk. Don't open the disk drive while this light is on.
- The 80/40 Column switch determines whether your screen will display 40 or 80 characters across. You must set the switch before turning on the computer.

Monitors produce sharper images (have better resolution) than televisions, so they can display 80 characters (letters, numbers, and so on) across. Televisions can clearly display only 40 characters across.

When the switch is down, it's set to 40 columns—the correct setting for televisions. When the switch is up, it's set to 80 columns—the correct setting for monitors. Once you set the switch, you shouldn't have to change the setting, unless you alternate between using a monitor and a television.

Some programs require an 80-column display. Some programs are designed to display only 40 columns and will show up as 40 columns whether your switch is set to 80 or not.



- The Keyboard switch alternates between two keyboard layouts: the standard keyboard and the Dvorak keyboard.

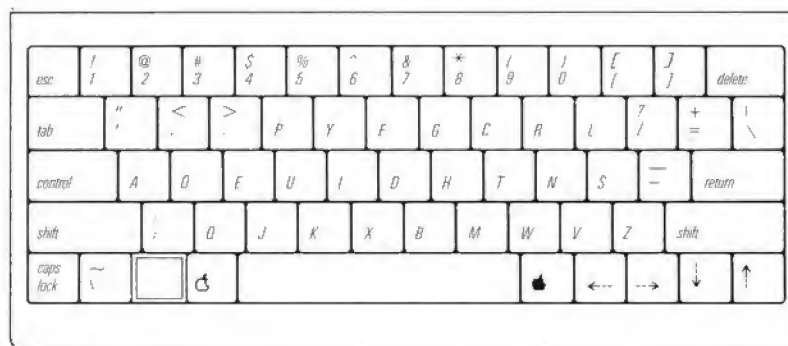
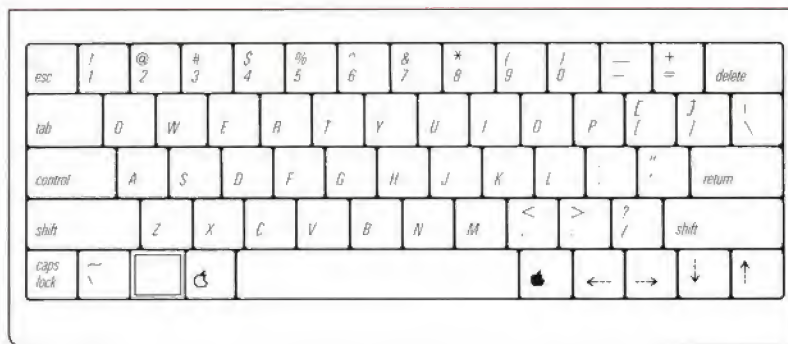
Pressing down the Keyboard switch gives you the Dvorak keyboard, also known as the American simplified keyboard. You'll know the Keyboard switch is set to the Dvorak keyboard if, for example, you type the letter *S* and the letter *O* appears on the screen.

The simplified keyboard was designed by August Dvorak to increase typing speed and efficiency by locating frequently used keys in the home-base row. See Figure 1-14.

If you choose to use the Dvorak keyboard, you'll probably want to rearrange the Apple IIc keycaps. Gently pry off the keys in the bottom row with a regular screwdriver. After that, you'll be able to pry off the remaining keys by hand. Rearrange them as shown in Figure 1-14.



Figure 1-14. The Standard Keyboard and the Dvorak (Simplified) Keyboard



## What Now?

---

At this point you have several options:

- You can take a break.
- You can apply what you've learned to using the games and programs on *The Apple at Play* (or any game programs you have).
- You can go to Chapter 2 and learn how to use ready-made programs.
- You can go to Chapter 3 and learn about the inner workings of the computer.
- You can go to Chapter 4 and learn how to write your own programs.

But before you go off on your own, you need to know three things: how to start up the Apple IIc when the power is off, how to start up the Apple IIc when the power is on, and how to turn off the power when you've finished using the computer for the day.

## Starting Up

---

Starting up is sometimes called booting. Don't let the jargon throw you—it all means the same thing.

A startup disk is a disk with one or more programs on it that starts automatically. All the disks that are part of the guide and most commercially available programs are startup disks.

There are two ways to start up the Apple IIc. You already know how to start up the Apple IIc when the power is off:

1. Put a startup disk in the built-in disk drive, also known as drive 1.
2. Turn on the monitor.
3. Turn on the power.

These steps are illustrated in Figure 1-15.

Figure 1-15. Starting Up With the Power Off





**Important!**

If you turn off the computer and then decide to turn it on again, be sure to wait 15 seconds.

### Starting Up With the Power On

To start up when the power is already on:

1. Make sure the Disk Use light is off.
2. Take the last disk you were using out of the built-in disk drive, also known as drive 1.
3. Put the disk you want to start up into the built-in disk drive and close the drive door.
4. Hold down  and **CONTROL** while you press **RESET**, then release all three keys. (If it seems a little awkward, you're doing it right. If it were more convenient, you might do it accidentally.)

This method—pressing  **CONTROL** **RESET**—is also known as restarting your computer.


These steps are illustrated in Figure 1-16.



Figure 1-16. Starting Up With the Power On



**Start or Restart?** Restarting is almost like turning the computer off and then on. But it's easier on the power switch. So if the power is already on, restart your computer by pressing

 **CONTROL** **RESET**.

---

## Stopping the Computer

To turn off the computer:

1. Make sure the Disk Use light is off.
2. Turn off the monitor or television.
3. Turn off the Apple IIc power switch.

### Important!

If you turn off the computer and then decide to turn it on again, be sure to wait 15 seconds.

**By the Way:** The computer uses less power than a 100-watt light bulb, so you don't need to turn it off for 20-minute coffee breaks.


## Hands On—The Apple at Play

You'll find *The Apple at Play* on the flip side of *An Introduction*.



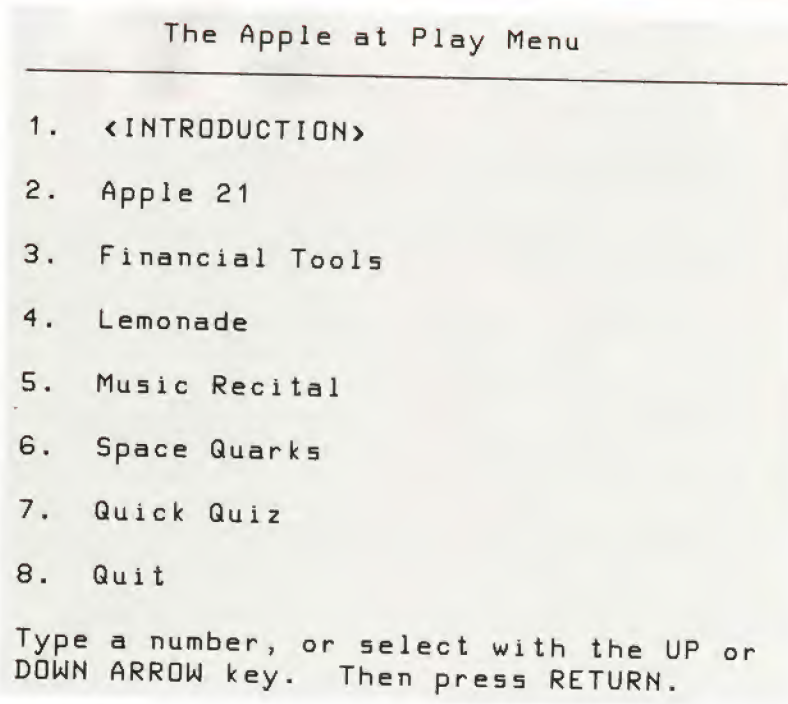
If you want to use the programs on *The Apple at Play*, put it in the built-in disk drive and start up the Apple IIc. Make sure the side labeled *The Apple at Play* is facing up when you put it in the built-in disk drive. If you don't remember how to start up, review the instructions in "Starting Up" and "Starting Up With the Power On."

**The Real World:** The programs on *The Apple at Play* disk are not simulations. They are actual programs. They are included with the guide to give you a feel for the real world. Like real world programs, each program on *The Apple at Play* works a little differently. Read each program's instructions carefully. If you get stuck, don't worry about it. You can restart the disk by pressing

 **CONTROL** **RESET**

Your screen should look like Figure 1-17.

Figure 1-17. The Apple at Play Menu



Look for Lemonade and other exciting educational games on *Apple Education Classics*.



Here are the programs you'll find on *The Apple at Play*:

- Apple 21: Challenge the computer cardshark for big (but make-believe) bucks.
- Financial Tools: Figure loans, depreciation, and interest rates.
- Lemonade: Test your skill as the chief executive officer of a lemonade stand.
- Music Recital: Hum along with the Apple IIc.
- Space Quarks: Shoot 'em up in outer space.
- Quick Quiz: Test your mastery of the material in the guide. See what you know now, then come back later and see how your score improves.

Welcome back. Hope you enjoyed the game disk.



## Disks

Figure 1-18 shows a 5 1/4-inch flexible (floppy) disk—the kind you use with your Apple IIe.

Figure 1-18. A Flexible Disk



You can buy blank disks for storing your information. And you can buy disks containing programs—instructions that tell your computer what to do.

The disk itself is permanently sealed inside a black, plastic jacket that protects the disk from fingerprints and dust. The disk is made of thin plastic and is covered with metallic oxide so that information can be recorded on it magnetically—the way sound is recorded on cassette tape.

You can see part of the disk through the oval cutout in the disk jacket. Don't touch the disk through the oval cutout or you defeat the purpose of the jacket! When the disk drive is in use, the disk spins inside its jacket, so all areas of the disk can be reached through the oval cutout.

The notch on the upper-right corner of the disk is called the **write-enable notch**. If that notch is covered, you can't write (save) things on the disk or otherwise change the contents of the disk, but you can read (load) things from the disk. If the notch is uncovered, you can write on it. Writing doesn't take place through the notch. The notch just indicates whether or not it's OK to write on the disk.

Many programs that you buy don't have a write-enable notch because the manufacturer doesn't want you to change the contents of the disk. When you don't want the contents of your disks changed (by mistake), you can cover the write-enable notch with a removable **write-protect tab**. See Figure 1-19. (You'll find sheets of write-protect tabs packed with boxes of blank disks.)

As you may have noticed, it is possible to record information on both sides of a disk, but it's not recommended (the disks must be certified for double-sided use).

Put single-sided disks in the disk drive with the label facing up. If the disk doesn't have a label, put it in the disk drive with the seams facing down.

Figure 1-19. Cover the Notch With a Write-Protect Tab



Write-Protect Tab

▲ **Warning**

Do not put a disk with a torn label or torn write-protect tab in the disk drive—the disk can become impossible to move.

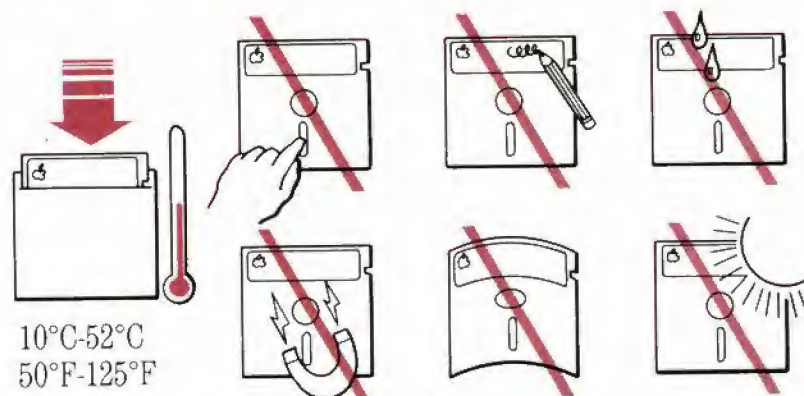
### **Disk Capacity**

Each disk can hold approximately 143,000 characters. How that figure translates into pages of text or number of financial models you can fit on a disk depends on the program you're using. You might be able to fit 50 to 75 pages of a novel on a disk, but only one financial model.

## Care of Disks

It's best to store your disks in their envelopes in a disk holder. If you don't have a special disk holder, a shoe box works fine. Keep your disks away from direct sunlight (they warp), spilled milk (they drown), and things like telephones that contain magnets (they scramble). It's OK to leave your disks on the disk drive, but don't leave them lying on your monitor or TV. Write on disk labels with a felt-tip pen. Pencils and ball-point pens can damage disks. See Figure 1-20.

Figure 1-20. Do's and Don'ts of Disk Care





When Is It OK to Take Out a Disk? The simple answer to this question is that it's OK to take out a disk from the disk drive whenever the Disk Use light is off. But it's a little more involved than that.

Technically it's OK to remove the disk as soon as the sound stops and the light goes off, but it's not a good habit to get into. Here's why. Some programs are only loaded into the computer one piece at a time. As other pieces are needed, the computer looks for those pieces on the disk. If you've removed the disk, those pieces can't be loaded and the program hangs (or dies).

Until you learn to distinguish between programs that load one piece at a time and those that load in one fell swoop, leave your program disk in the built-in drive until you're finished using the program or until you're ready to save your work on another disk. (If you have an external disk drive, the only time you have to remove your program disk from the built-in disk drive is when you switch programs or use both drives for copying.)

## Chapter 1 Summary

---







### Starting Up With the Power Off

1. Put a startup disk in the built-in disk drive (drive 1).
2. Turn on your monitor.
3. Turn on the Apple IIc.

### Starting Up With the Power On

1. Put a startup disk in the built-in disk drive (drive 1).
2. Hold down  and **CONTROL** while you press **RESET**.

### Special Keys

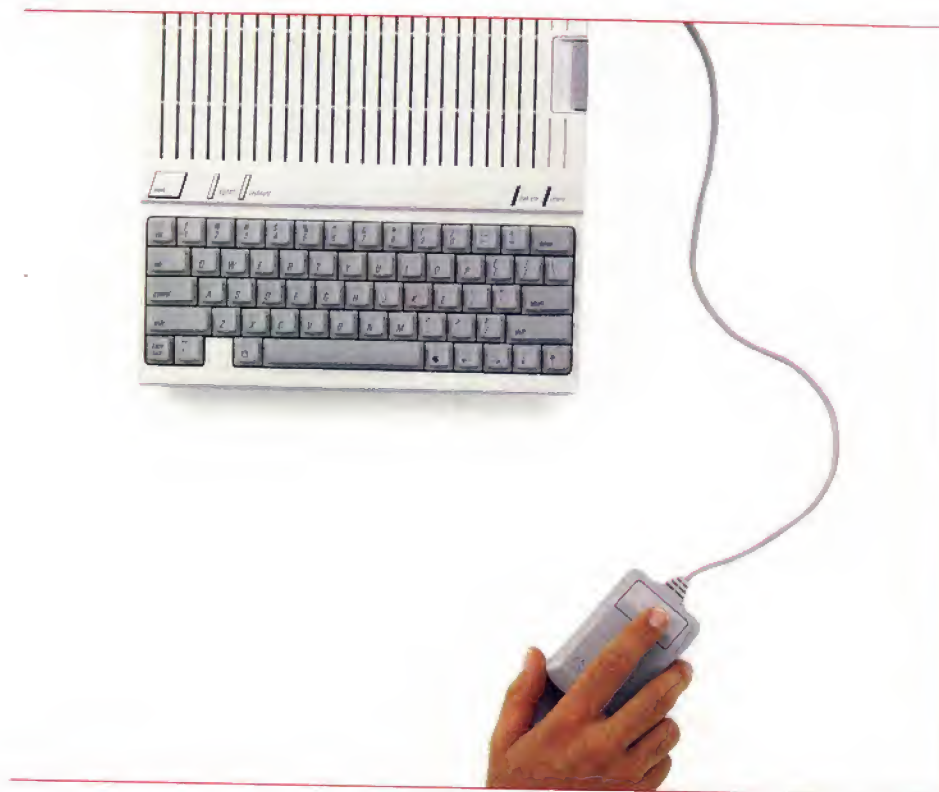
<b>RETURN</b>	Indicates that you've finished reading or typing something and that you're ready to proceed.
<b>ESC</b>	Gets you back to a previous menu or out of what you're doing.
<b>DELETE</b>	Erases characters to the left of the cursor.
	Moves the cursor.
	
	
	
<b>CAPS LOCK</b>	Capitalizes all letters automatically.
<b>CONTROL</b>	Make other keys behave differently.
	
	

### Special Switches

80/40 Column switch	Determines whether screen displays 40 or 80 characters across. Should be set to 40 (down) for a TV and 80 (up) for a monitor.
Keyboard switch	Switches to an alternate keyboard, called the Dvorak keyboard.

## Chapter 2

## Putting the Apple IIc to Work





So far you've been using the computer to learn about the computer. You can also use the computer to write letters, prepare business reports, play games, prepare your income taxes, balance your checkbook, file your recipes, catalog your stamp collection, address your holiday cards, keep your bowling team scores, and learn to pilot a plane.

The magic that transforms your computer from a cockpit to a file cabinet is the program you feed into it. Programs designed for a particular purpose or application are called **application programs**. You can write them yourself (as you'll learn in Chapter 4) or you can use ready-made programs.


---

## Hands On—The Apple at Work

Notice that *The Apple at Work* disk has two sides—a 40-column side and an 80-column side. If you're using a television for a display device, the 40-column side of the disk should be facing up when you put the disk in the disk drive. If you're using a monitor, the 80-column side should be facing up.

Start up *The Apple at Work* for a demonstration of three popular types of application programs.

If you don't remember how to start up the computer, review the instructions in "Starting Up" and "Starting Up With the Power On" in Chapter 1.

**Gibberish Fill the Screen?** Take *The Apple at Work* out of the disk drive and check the label. If your 80/40 Column switch is down, you should have the 40-column side of the disk facing up. If your 80/40 Column switch is up, you should have the 80-column side of the disk facing up. Put the disk back in the disk drive and restart the computer (press -CONTROL-RESET).

Keep in mind that this disk is only a simulation; that is, you can't use it to write letters, prepare budgets, or organize your files. Once you have completed *The Apple at Work*, you'll be equipped to go to your dealer and choose the application programs that fit your needs.

By the Way: This is a simulation of a program called Appleworks. The actual program requires an 80-column display—you wouldn't be able to use it with a television set.

When you're finished with the disk, come back here for more on application programs.

## Application Programs

---



Welcome back. *The Apple at Work* simulated three applications. Not all word processing, spreadsheet, and data base programs work the same way. Application programs vary tremendously in ease of use and in special features (bells and whistles) they offer. Decide which applications you want, then ask your authorized Apple dealer to help you select one that meets your needs. Plan to spend several hours learning to use each application program—and several weeks mastering each one.

## Popular Programs

Here are short descriptions of the most popular applications.

- **Word Processing:** For writing. Lets you write, erase, rearrange, and otherwise speed the writing process. Figure 2-1 shows a typical word processing display.

Figure 2-1. Word Processing Display

```
File: holiday                REVIEW/ADD/CHANGE                Escape: Main Menu
=====
Dear Pat and Dick,

Sure is good to be writing you again. I can't believe it's been a year!

About the biggest news here is that we bought an Apple computer. In
fact, I'm using it right now to write you this letter. And you know if
butter fingers me can get it to work, it's got to be easy to use!

Nan and the kids are doing fine. Nan's been writing a lot of articles and
I'm still killing myself at the office. In my "spare" time I'm managing
Jimmy's ball team and let me tell you, those kids are GOOD.

How are your kids, by the way? I'd really like to hear from you. Why not
buy a computer? It makes letter writing a breeze. Anyway, happy new
year and do keep in touch.

                                Love,

                                Harry and Nan

-----
Type entry or use OA commands   Line 3  Column 2   OA-? for Help
```



- Data Base (or Data Management): For keeping track of lists of information, such as names, addresses, phone numbers, birthdays, inventories, or collectible objects. They make it easy to recall, update, sort, and cross-reference information. Figure 2-2 shows a typical data base program display.

Figure 2-2. Data Base Display

```
File: CELEB                                REVIEW/ADD/CHANGE                                Escape: Main Menu

Selection:  All records

Pseudonym          Real Name          Sign          Birth-year  Profession
=====
Arden, Eve         Quedens, Eunice   Taurus        1912        actor
Arthur, Jean       Greene, Gladys     Libra         1908        actor
Astor, Mary        Langhanke, Lucille Taurus        1906        actor
Barrymore, John    Blythe, John      Aquarius      1882        actor
Brice, Fanny       Borach, Fanny     Scorpio       1891        comedian
Burns, George      Birnbaum, Nathan  Aquarius      1896        comedian
Checker, Chubby    Evans, Ernest     Libra         1941        singer
Crawford, Joan     Le Sueur, Lucille Aries         1908        actor
Douglas, Kirk      Demsky, Issur     Sagittarius   1916        actor
Dylan, Bob         Zimmerman, Robert Gemini          1941        singer
Evans, Dale        Smith, Frances    Scorpio       1912        actor

-----
Type entry or use DA commands  Line 3  Column 2  DA-? for Help
```

- **Spreadsheet:** For producing financial statements, preparing budgets, estimating costs, and performing other number-crunching tasks you'd otherwise undertake with pencil, eraser, and calculator. Once you enter your information, you can try out different investments or pricing strategies without reentering the information. Figure 2-3 shows a typical spreadsheet display.

Figure 2-3. Spreadsheet Display

```

File: Wreckers.Budget          REVIEW/ADD/CHANGE          Escape: Main Menu
=====A=====B=====C=====D=====E=====F=====G=====H=====I=====J=====
1:
2:          BUDGET:  BIG BOY AUTO WRECKERS
3:
4: INCOME
5:          Raffle, Net                      800.00
6:          From Big Boy for uniforms      15.00      20      300.00
7: -----
8: TOTAL INCOME                                1100.00
9:
10: EXPENSES
11:          Root Beer and Pizza            235.00
12:          Bats                          8.00      20      160.00
13:          Uniforms                     50.00      20      1000.00
14: -----
15: TOTAL EXPENSES                                1395.00
16: =====
17: DONATIONS NEEDED                                295.00
18:
=====A-----B-----C-----D-----E-----F-----G-----H-----I-----J-----

```

- **Education:** For learning. Experience learning with a private and very patient tutor. Learn typing, Spanish, math, or anything else—at your own speed.



- **Home Finance:** For keeping track of income and expenses. Helps with budgeting, keeps track of deductible expenses for tax time, even helps balance your checkbook.
- **Communication:** For talking to other computers—big and small—by phone. With a communications program, such as Apple Access II, and a modem, you can tie into computerized information services for the latest stock prices or other information.
- **Games:** For fun. Shoot 'em up with enemy spacecraft or crawl through dungeons in quest of treasure.
- **Graphics:** For creating charts, graphs, or computer drawings.

### **Things You Can Do With Your Apple IIc**

There are thousands of programs for the Apple II family of computers. Here's a list to give you an idea of some of the ways people use computers. The list is grouped by application.

#### **Communication**

- Get the latest stock quotes.
- Read the headlines between newscasts.
- Thumb through the card catalog at your nearest computerized library.
- Send messages to Apples across town or country.

#### **Data Base**

- Catalog your home library (and call up books by title, author, or color of cover—you can tell a book by its cover).
- Keep an inventory of your valuables for insurance purposes.
- Keep track of your jogging times and distances.
- Catalog your Elvis Presley memorabilia.
- Pick a recipe by ingredient (mushrooms), by name (Coq au Vin), or by nationality (French).
- Catalog your business card collection.



- Keep statistics on your favorite baseball team or little league.
- Computerize your phone book (then get a listing of potential tennis partners).

### **Education**

- Study for college entrance exams.
- Learn to pilot a plane.
- Learn to read music.
- Learn math or spelling with electronic flashcards.
- Learn touch typing.
- Learn Spanish or French.

### **Games**

- Chase gum drops through a maze.
- Find your way out of a dungeon.
- Shoot 'em up with space villains.
- Gamble at blackjack or roulette without losing your shirt.
- Play golf on a rainy day.
- Play a game of chess.

### **Graphics**

- Draw house plans or wiring schematics.
- Create charts and graphs for business presentations.
- Draw a self-portrait (and see how you'd look with a mustache or bangs).

### **Home Finance**

- Manage your own stock portfolio; make sure your broker is giving you sound advice.
- Prepare your income taxes.
- Do your banking without leaving home.

### **Specialty Programs**

- Plan your diet and count calories.
- Do your own horse handicapping and improve your odds at the track.
- Write music.
- Find out if it's a good day for romance (check your horoscope).
- Keep a watering and fertilizing schedule for your house plants.

### **Spreadsheet**

- Try out potential investments before you sink money into that kiwi farm in South Dakota.
- Find out if you can afford payments for a new car, yacht, swimming pool, or other extravagance.
- Do a cost estimate to see if it's feasible to add a second story to your house.
- Run a lemonade stand or other small business out of your garage.
- Prepare yourself to pay your income taxes by doing financial planning and budgeting year-round.

### **Word Processing**

- Write a computer book (everyone else is).
- Write your resume and customize it for different job openings.

- Create a perfect business letter (without bothering your secretary) then personalize it for everyone on the board.
- Write a term paper (then change the margins to make it look longer).
- Write a novel (and change the name of the hero without a lot of retyping).

## What Now?

---

*The Apple at Work* demonstrates what it's like to create and revise budgets, lists, and letters. Go to Chapter 3 to find out how the computer stores your budgets, lists, and letters while you're working on them and how you can save your work onto disks for permanent storage.

## Chapter 2 Summary

---

Application programs are programs designed for a particular purpose, such as budgeting, financial planning, or cataloging your butterfly collection.

### Popular Applications:

Word Processing	For generating letters, reports, and books.
Data Base	For keeping track of lists (addresses, inventories, collectibles).
Spreadsheet	For financial planning.
Education	For learning and expanding your horizon.
Graphics	For charts, graphs, and drawings.
Communication	For talking to other computers or computer services by phone.
Games	For fun.
Home Finance	For budgeting, portfolio management, and tax planning.



## Chapter 3

## The Inside Story



By now you've had some experience operating the computer. But what's going on behind the scenes? What makes the computer run? What really happens when you put a startup disk in the built-in drive and turn on the power?

## Hands On—The Inside Story

---

*The Inside Story* is on the flip side of *Exploring Apple Logo*. Make sure *The Inside Story* label is facing up when you put the disk in the built-in disk drive.



Understanding how the computer works will eliminate its mystery and allow you to be more productive and playful with the machine. Start up *The Inside Story* disk to find out what makes your computer tick.

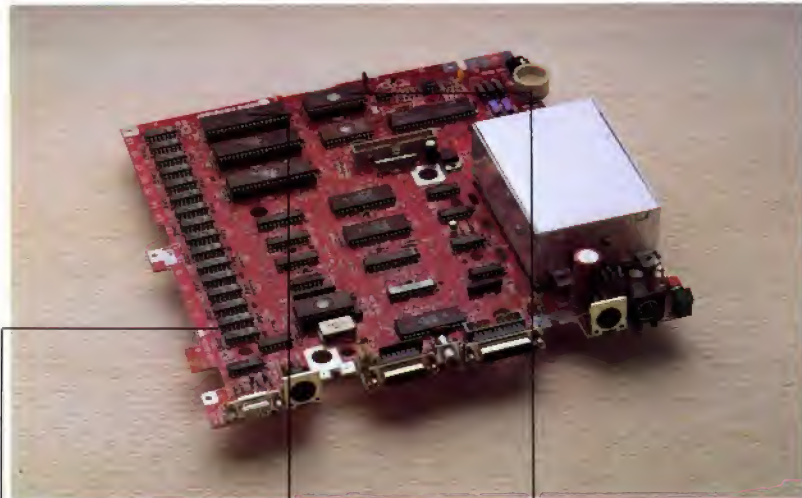
## Meet the Players

---



Welcome back. Now you know what's going on under the hood. Here's a closer look at the components that put the computer through its paces (Figure 3-1). If you don't care about the innards of the Apple IIc, skip to "How It Works."

Figure 3-1. Main Logic Board



**RAM** (Short for random-access memory.): This is where programs and information are stored—the kind of information that changes from use to use and from user to user. Anything stored here is temporary. When you turn off the power, the information in RAM is erased.

**Microprocessor:** The brains behind the operation. The microprocessor carries out the instructions in the program.

**ROM** (Short for read-only memory.): Anything stored here is permanent and not changeable by the user! ROM contains, among other things, information the computer needs to get started. The programs in ROM are called firmware because they are more permanent than software.

Figure 3-2. Close-Up of Chips



RAM, ROM, and the microprocessor are **integrated circuits (ICs)**: networks of microfine wires that conduct electrical impulses. The circuits are etched on silicon wafers, which reside on black, plastic chips that look like mechanical centipedes. See Figure 3-2.

The centipede legs are pins that connect the computer's memory (RAM and ROM) to the brain (the microprocessor) via electrical roads called **traces**.



Interface is a fancy word for go-between.

A peripheral device is an accessory.

In addition to the RAM, ROM, and the microprocessor, there are custom-made ICs that **interface** (or manage communication) between the microprocessor and **peripheral devices**. The Apple IIc has built-in interfaces for a second disk drive; a printer or plotter; a modem; and a mouse, joystick, or pair of hand controls.

## How It Works

---

You don't need to know everything about how the computer works to run programs successfully. But you should have a feel for what it means to start up (or boot) the computer, create information, save information in a file on a disk, and retrieve information.

### Starting Up

---

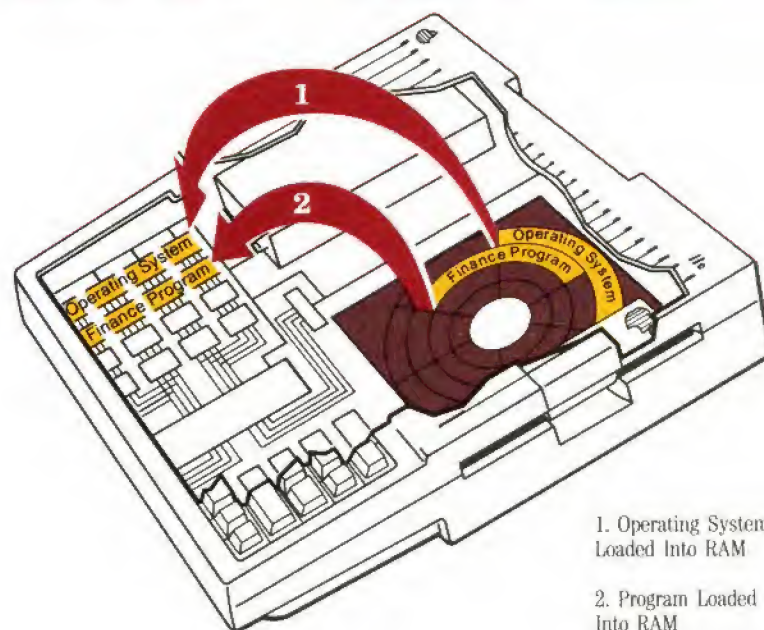
You've already had lots of practice with this one. It's what you do when you put a disk in the built-in disk drive and turn on the power. (Or when you hold down **⌘** and **CONTROL** while you press **RESET**). This method of starting the computer with the power already on is also called **restarting**.)

Every time you start your computer, a built-in program looks for a certain kind of disk in the built-in disk drive, drive 1. It's looking for a disk with an **operating system**. When it finds one, the operating system is put into memory.

The operating system is a combination traffic cop and housekeeper. It controls the way your program is loaded into memory, the way the computer works with information, the way your information will be stored on a disk, and the way the computer talks to your printer and other peripheral devices. Once the operating system is in memory, the application program is put into another part of memory, and your computer takes on its personality as a number cruncher or space invader. See Figure 3-3.

Memory is a general term for RAM—the storage compartments inside your computer that hold programs and information you're working on. Computer memory capacity is measured in K's, short for kilobyte. (A kilobyte is to a thousand what a baker's dozen is to a dozen—1024 bytes to be exact.) One byte holds one character. The Apple IIc has 128K RAM, more than enough for most popular business and entertainment programs.

Figure 3-3. Starting Up. Once the operating system is in memory, it loads the application program.



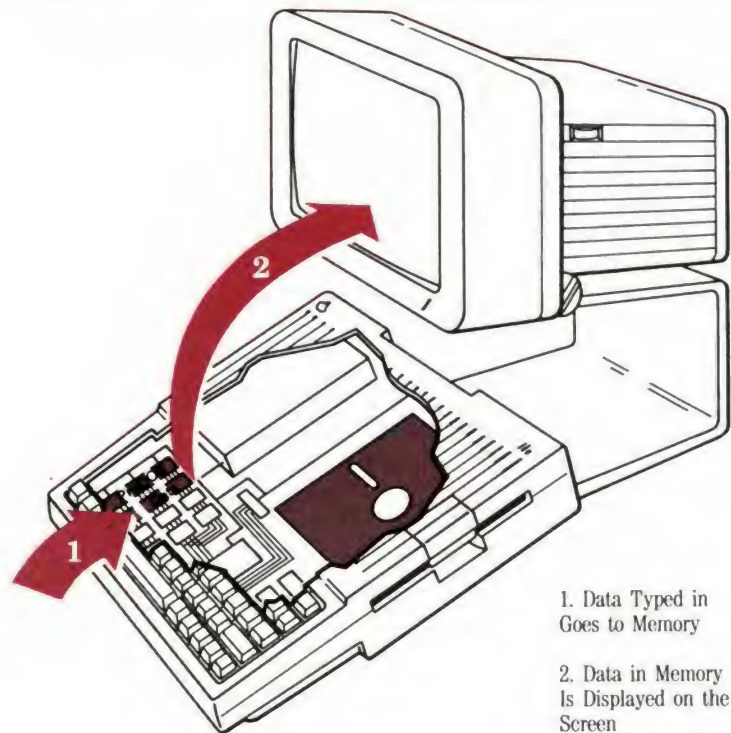
### **Creating Information**

When your application program is in memory, you can start using it to figure out investment strategies, to compose sonnets, or to design sports cars—depending on what kind of program is in memory.

The numbers, words, and other raw information you feed into the computer are called data. As you type information, it is sent to yet another part of memory and displayed on the screen where you can see it. Figure 3-4 illustrates how the operating system, the application program, and your data share memory.



Figure 3-4. Your Information Is Kept in Memory, Too

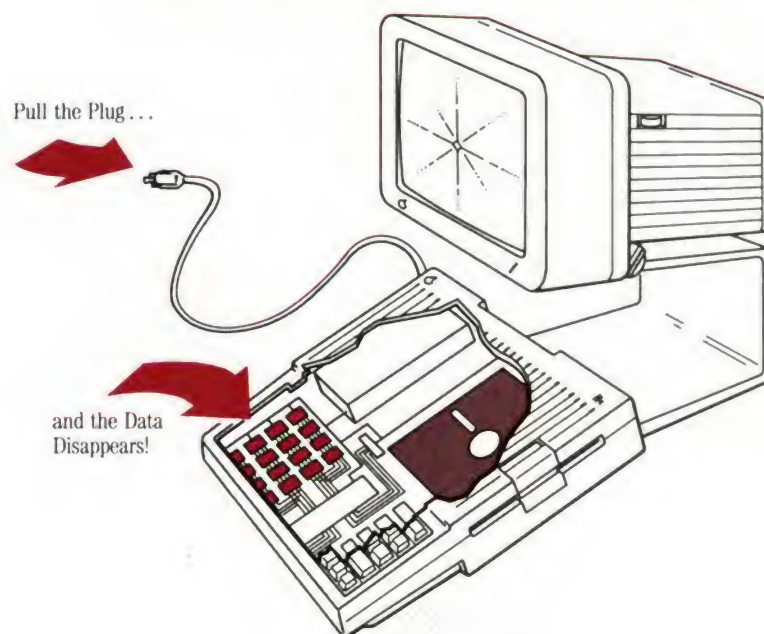


It's important for you to realize that what you see on the screen is only temporarily stored in the memory of the computer. It's not like a typewriter where what you type appears on a page in a more or less permanent form.

If you turn off your computer, switch to another program, or trip over the power cord, your data is gone forever. See Figure 3-5. That's why it's important to save a copy of your work on a disk. It's a good idea to save your work every ten minutes or after any particularly inspired entry.



Figure 3-5. Memory Is Temporary



**Scrolling:** There's a lot more room in memory than there is room on the screen to display it. You can use the arrow keys in most programs to see other information in memory. Just move the cursor to an edge of the screen by using one of the arrow keys. Press the arrow key again, and a new line or column will come into view. This is called scrolling and is illustrated in Figure 3-6.

Figure 3-6. Scrolling



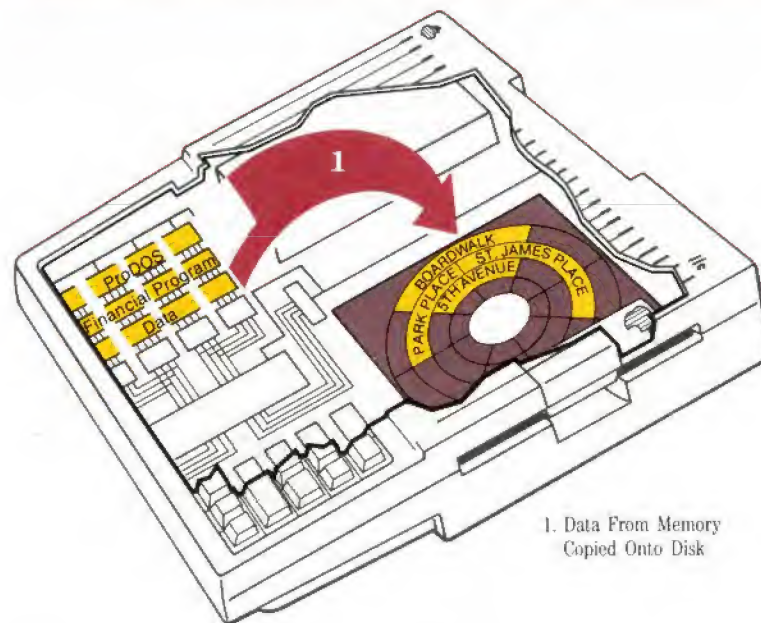
A file is a collection of information. It can be a poem, a profit/loss statement, a phone list, and so on.

### **Saving Information on a Disk**

When you save the information in memory onto a disk, you put it in a **file**. Think of your disk as a file cabinet; think of each file as a folder where you keep your information. How you save the information in a file on a disk varies from program to program.

The computer doesn't transfer what's in memory to the disk, it only sends a copy. Your information stays in memory until you turn off the computer or start working with different data. See Figure 3-7.

Figure 3-7. Saving Information in a File on a Disk



Information stored on a disk is much more permanent than information stored in the memory of the computer. But even information on a disk is vulnerable. That's why it's a good idea to keep at least two copies of all your data disks. This practice is called **backing up**. Most application programs will tell you how to make backup copies.

**Formatting Disks:** Before you can save your work on a blank disk, you have to format the disk. Formatting a disk means dividing the magnetic surface of the disk into sections (called **sectors**) where information can be stored. The reason disks don't come preformatted is that different computers require different formats. (You need to format a disk only once. If you format the disk again, everything on the disk is erased.) You'll learn everything you need to know about formatting in the *System Utilities* part of this manual.



## **Filenames**

When you save a file on a disk, you give that file a name. You can name your files anything you want as long as you observe these general filename rules:

- Maximum of 15 characters long.
- Numbers, letters, periods (no other punctuation) permitted.
- Must begin with a letter.
- No spaces permitted.

Some programs have slightly different rules, but if you follow these, you can't go wrong.

## **Retrieving Information From a Disk**

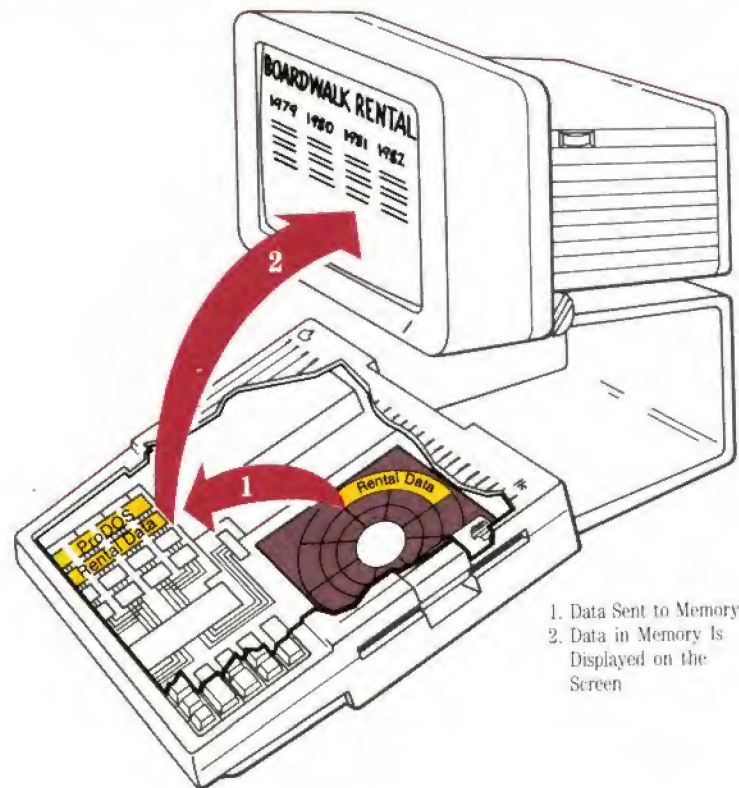
To retrieve information you've saved on a disk, you start up the computer with the program you used to create the data, you ask for the file by name, and a copy of the file is loaded into the memory of the computer. (Again, how to retrieve information from a disk varies from program to program.) See Figure 3-8.

Once the information is loaded into the computer's memory, you can print it (if you have a printer hooked up to your computer), you can revise it, and you can save the new version in a file on your data disk.

The fact that you're only loading a *copy* of the file into memory frees you to rewrite and rearrange the information. If you don't like the results of your experiments, your original is still intact on the disk.

A data disk is a disk you use to store information.

Figure 3-8. Loading the Contents of a File Into Memory



1. Data Sent to Memory
2. Data in Memory Is Displayed on the Screen

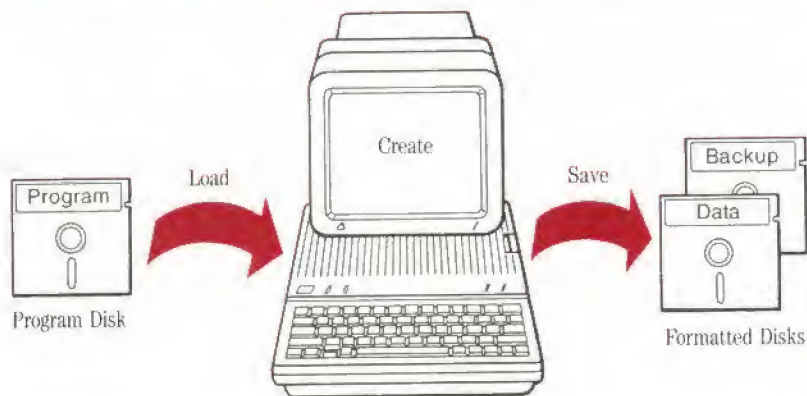
Once you finish working with a file, you can save it with the same name you used before, or you can give it a new name. If you save the revised information with the original filename, you write over (and lose) the original data. If you save the revised information with a new filename, both the original and the revised version are preserved on the disk. Each file on a disk must have its own unique name.

### **Putting It All Together**

Figure 3-9 illustrates the process of using an application program: starting up, creating information or data, saving the information in a file on a disk, and backing up that information.



Figure 3-9. Using an Application Program



**Programs and Data Don't Mix:** It's possible to combine programs and data on the same disk, but it's not a very good idea. For one thing, application programs can take up a lot of space on the disk, and while you might be able to squeeze one or two letters on your word processing program disk, you couldn't make a habit of it.

For another thing, many startup disks don't let you save data on them. They're **write protected**, which means you can't add anything to or change anything on the disk. Finally, startup disks are expensive. Application programs can cost hundreds of dollars. You don't want to risk erasing or copying over one by mistake.

### Operating Systems

*Most of the time you can ignore the operating system. It does its work behind the scenes. The only time you have to be concerned about the operating system is when you're formatting new disks and when you're saving information on disks.*

*There are three operating systems available for the Apple IIc (ProDOS™, DOS 3.3, and Pascal), and each operating system saves information on disks in a different way.*

*If your word processing program uses ProDOS, you have to save your data on ProDOS-formatted data disks. If your data base program uses the Pascal operating system, you have to save your data on Pascal-formatted data disks.*



Figure 3-10. Separate Disk Holders for Different Programs



Figure 3-11. Label Data Disks With the Operating System



Early DOS: The Apple IIc does not support DOS 3.2 or other operating systems designed for very early versions of the Apple II. But you can update programs and files created with those operating systems to DOS 3.3 by using a program on the utilities disk for the Apple IIc.

---

*You can't keep your word processing and data base data on the same disks unless the two programs use the same operating system.*

*Most people use only one or two programs for the bulk of their work, so it's not difficult to keep data disks straight. One solution is to keep separate disk holders for data created with different programs. See Figure 3-10.*

*Another solution is to label your data disks with the name of the program or operating system. See Figure 3-11.*

## Chapter 3 Summary

---

### Main Parts of the Computer

Microprocessor	Does the computing. Carries out the instructions in computer programs.
RAM	Short for <b>random-access memory</b> . This is where programs and data are stored temporarily. Whatever is in RAM goes away when power goes off.
ROM	Short for <b>read-only memory</b> . Permanent memory. Contains, among other things, information the computer needs to get started.

### Four Steps to Using a Computer

1. Starting up. Put a startup disk in drive 1, the built-in drive, and turn on the power.
2. Creating information. Use the keyboard to create letters, budgets, charts.
3. Saving information. Give what you've created a name and store it in a file on a disk for permanent storage.
4. Retrieving information. Load information from a file back into memory where you can change the contents of the file or send the contents of the file out to a printer to produce a paper copy.

## Chapter 4

## Programming





Writing a computer program involves taking a task, breaking it down into small steps that the computer can perform, and expressing those steps in terms the computer can understand. There's a program for almost every application under the sun, so you don't have to learn how to program. But a lot of people learn for the fun and the challenge of it.

### Why Program?

---

There are lots of good reasons for learning to program:

- It's an exercise in logic.
- It lets you write programs specific to your needs.
- It lets you control the operation of the computer.
- It gives you something to talk about with your child who is learning how to program in school.
- It helps justify the time you spend in front of your TV.
- It gives you the chance of writing a best-selling program.
- It's easier to understand the programs you buy.

But don't learn to program because you think you have to.

### Why Not Program?

---

There are also good reasons for *not* learning to program:

- You can use the computer successfully without knowing anything about programming, just as you can successfully drive your car without knowing how the engine works.
- Writing programs takes time—lots of it—and you might have other ways you'd rather spend yours.

## Learning to Program

---

If you'd like to find out what programming is all about, you've come to the right place. There are two disks in the guide designed to give you a feel for programming: *Exploring Apple Logo* and *Getting Down to BASIC*.

Don't Be Shy: Sampling these disks doesn't commit you to a life of programming. Even if you decide to leave programming to others, the skills you will learn—putting small pieces together to form a large structure and breaking large problems down into manageable steps—are valuable skills whether you program or not.

Just as there are different human languages, there are different computer languages. Logo and BASIC are two computer languages especially suited to new programmers.

If you decide you'd like to learn more about BASIC, you can get the *Applesoft Tutorial* and the *Applesoft BASIC Programmer's Reference Manual* from Apple, or you can choose books from another publisher more suited to your age, your area of interest (games, graphics, and so forth), and your level of programming expertise (from tutorials to technical reference manuals). If you'd prefer a more interactive learning experience, you can get an entire Applesoft BASIC training course on disk, similar to the interactive training programs that came with this manual, or you can enroll in a programming class at your local college.

If you decide you'd rather program in Logo, Pascal, or some other language, ask your dealer for the appropriate language disks, manuals, and other training materials.

## Logo

---

Logo is rapidly becoming a standard in the schools, because it's easy and fun to learn (with lots of emphasis on graphics), yet powerful enough for serious programming. In addition to building computer skills and confidence, Logo builds communication skills, as children and adults bounce programming ideas off each other.



## Hands On—Exploring Apple Logo

*Exploring Apple Logo* is on the flip side of *The Inside Story*. Make sure the *Exploring Apple Logo* label is facing up when you put it in the built-in disk drive.



Figure 4-1. Logo Art



Start up *Exploring Apple Logo*. Mark your place so you know to come back here when you're finished.

If you don't remember how to start up, review the instructions in "Starting Up" and "Starting Up With the Power On" in Chapter 1.

## Logo Revisited

Welcome back. *Exploring Apple Logo* teaches you some important programming concepts. It teaches you to combine simple steps into increasingly complex procedures. You can see why Logo is a popular language with parents who want to learn about computers along with their kids. You can write Apple Logo programs for fun or for serious applications—like the compound interest program you saw on *Exploring Apple Logo*. Figure 4-1 shows you the kind of graphics you can create with Apple Logo.

If you'd like to have Apple Logo for yourself or your family, ask your Apple dealer for the Apple Logo II package. This package includes the Logo language disk, a reference manual, a clear and easy to follow Logo Tutorial, and a training disk that introduces more Logo features.

## BASIC

BASIC (short for Beginners All-purpose Symbolic Instruction Code) is also easy to learn. BASIC allows you to write instructions for the computer in English-like words and phrases. It has the additional advantage of being built into your computer (so it's free).

BASIC was the first language built into personal computers, so you'll find that a lot of your computer friends speak the same language. There are several different dialects of BASIC. The Apple IIc dialect is called Applesoft BASIC.



## Hands On—Getting Down to BASIC



Start up *Getting Down to BASIC*, and come back here when you're finished. If you don't remember how to start up, review the instructions in "Starting Up" and "Starting Up With the Power On" in Chapter 1.



### Getting Down to BASIC

Welcome back. *Getting Down to BASIC* introduced you to a lot of programming concepts. This section summarizes the disk and introduces you to some more Applesoft BASIC. Remember, though, that only a small portion of Applesoft BASIC is covered here. For a description of Applesoft in all its glory, ask your dealer for the *Applesoft Tutorial* and the *Applesoft BASIC Programmer's Reference Manual*.

### Getting Into BASIC

Before you can write BASIC programs, you have to get into the BASIC programming environment. There are a couple of ways to do this. You can start up *Getting Down to BASIC* and choose the Quit option, or you can start up *System Utilities* and choose the Exit option. Either method loads ProDOS and gets you into Applesoft BASIC.

### Printing Numbers and Doing Calculations

Applesoft's PRINT statement lets you print information on the screen. One function of the PRINT statement is to print numbers. To print the number 5, you'd type **PRINT 5** and press **(RETURN)**. You can use your computer as a calculator to add, subtract, multiply, and divide using these symbols:

Addition  
Subtraction  
Multiplication  
Division

+  
-  
\*  
/

To multiply 44 by 55, you'd type **PRINT 44 \* 55**.

Don't forget that you must press **(RETURN)** after every Applesoft statement.

## Moving On

Your computer can do calculations that require more than one operation. Here's the order in which Applesoft performs such calculations:

This order is known as precedence.

Parentheses (innermost first)	( )
Multiplication and Division	* /
Addition and Subtraction	+ -

Calculations of the same type (two additions) or of the same priority (for example, addition and subtraction) are performed from left to right.

See if you get the same answers:

$$9 + 4 * 3 = 21$$

Hint: The computer does multiplication before it does addition.

$$(9 + 4) * 3 = 39$$

Hint: The computer always does what's in parentheses first.

$$4 - 16 / 4 = 0$$

Hint: The computer does division before subtraction.

$$(2 + 3) + (4 * 3) + 6 / (1 + 1) / 3 = 18$$

Hint: The computer does what's in parentheses first. Then, by priority, the computer performs calculations of the same type from left to right. Division is done before addition.

When in doubt, put parentheses around the operation you want done first.

**Computer as Calculator:** You can use your computer as a calculator any time you're in Applesoft BASIC. As you know, there are several ways to get into Applesoft BASIC. But if all you want to do is use your computer for some calculations, it's quicker to start up your computer without a disk in the built-in disk drive. Take the disk out of the disk drive and hold down **CONTROL** while you press **RESET**. (This puts you into Applesoft BASIC, but does not load ProDOS—you'll be able to write programs and do calculations, but you won't be able to save them on a disk.)



Remember, you can press  $\square$  and  $\square$  to correct typing mistakes.

### Printing Words

When you want the computer to display a word or any set of characters, type what you want to see inside quotation marks. To print the words *JIGSAW PUZZLE*, you'd type

```
PRINT "JIGSAW PUZZLE"
```

To print the equation  $3 + 4$ , you'd type

```
PRINT "3 + 4"
```

If you wanted to know the sum of  $3 + 4$ , you'd type

```
PRINT 3 + 4
```

without the quotation marks.

### Moving On

**A Typing Timesaver:** In Applesoft BASIC, you can use a question mark (?) in place of PRINT. For example, if you type 

```
PRINT 4 + 4
```

 or 

```
?4 + 4
```

, the Apple displays 8.

**Formatting Print Statements:** If you use a semicolon between parts of a PRINT statement, the parts are printed next to each other without any extra spaces. For example, if you type

```
PRINT "2 + 3 =" ; 2 + 3
```

the computer displays  $2 + 3 = 5$ .

Notice that the semicolon goes outside the quotation mark.

### Writing Programs

A computer program is a set of instructions that tell the computer what to do. You can write Applesoft BASIC statements in either immediate execution or deferred execution. In **immediate execution**, each statement is executed immediately after you press **RETURN**.

In **deferred execution**, each statement you type is put into the computer's memory and stored until you type **RUN** to execute the program. To write a statement in deferred execution, you must begin the statement with a line number.



**10 PRINT "HI THERE"** is an example of a deferred execution statement.

Every program should end with an **END** statement. The **END** statement tells the computer that the program is finished.

To see the lines of your program on your screen, type **LIST**.

Here's a summary of how to add, delete, insert, and correct lines in your program:

- To add a line to a program, type a new line number, followed by the statement, and then press **(RETURN)**.
- To delete a line from a program, type the line number of the line you want to delete and press **(RETURN)**.
- To insert a line in a program, type a line number that's between two existing line numbers, followed by the statement, and then press **(RETURN)**.
- To correct a line in a program, retype the line number and then type your revised statement.

### Moving On

**Adding Blank Lines:** To add a blank line to a program, simply type a line number, followed by **PRINT**, and then press **(RETURN)**.

If you type this program,

```
10 PRINT "FEE FI"  
20 PRINT  
30 PRINT "FO FUM"  
40 END
```

your screen will show

```
FEE FI  
FO FUM
```

## **Variables and INPUT Statements**

A variable is a name for a place inside your computer where information is temporarily stored.

There are two kinds of variables:

- Numeric variables (for storing numbers).
- String variables (for storing groups of characters, like names).

Every variable must have a name. Here are Applesoft's rules for naming variables:

- Every variable name must begin with a letter.
- A string variable name must end with a dollar sign (\$).
- Applesoft uses only the first two characters of a variable name to distinguish one variable from another. So, to Applesoft, TEST1 and TEST2 are the same variable. But it's a good idea to use whole words for variables because they're easier to remember than a pair of letters. Just make sure the first two characters are unique.

**BASIC Reserved Words:** As you're writing programs that use variables, avoid the following words and abbreviations and any words that include these words, like LETTER. (They're either Applesoft BASIC commands or ProDOS commands.) If you forget and use one of these commands as a variable by mistake, BASIC will try to use it as a command with unfortunate results.

&	EXP	LOG	RND
	FLASH	LOMEM:	ROT =
ABS	FLUSH	MID\$	RUN
AND	FN	NEW	SAVE
APPEND	FOR	NEXT	SCALE =
ASC	FP	NORMAL	SCRN(
AT	FRE	NOT	SHLOAD
ATN	GET	NOTRACE	SIN
BLOAD	GOSUB	ON	SPC(
BRUN	GOTO	ONERR	SPEED =
BSAVE	GR	OPEN	SQR
CALL	HCOLOR =	OR	STEP
CAT	HGR	PEL	STOP
CATALOG	HGR2	PEEK	STORE
CHAIN	HIMEM:	PLOT	STR\$
CHR\$	HLIN	POKE	TAB(
CLEAR	HOME	POP	TAN
CLOSE	HPlot	POS	TEXT
COLOR =	HTAB	POSITION	THEN
CONT	IF	PREFIX	TO
COS	IN#	PRINT	TRACE
CREATE	INPUT	PR#	UNLOCK
DATA	INT	READ	USR
DEF	INVERSE	RECALL	VAL
DEL	LEFT\$	REM	Vlin
DELETE	LEN	RENAME	VTAB
DIM	LET	RESTORE	WAIT
DRAW	LIST	RESUME	WRITE
END	LOAD	RETURN	XPlot
EXEC	LOCK	RIGHT\$	XDRAW

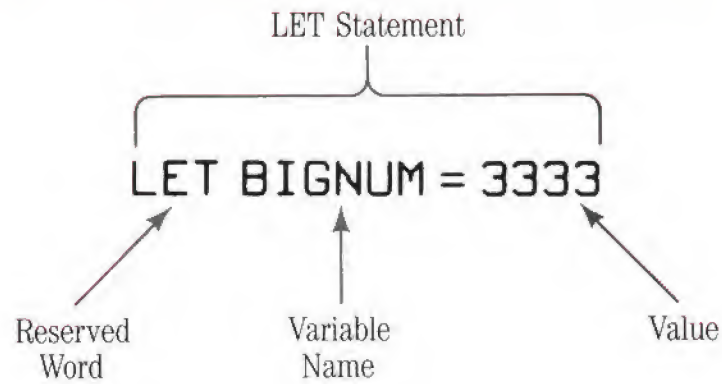
Don't worry if most of these commands are unfamiliar to you. You need to know only a handful of them to get a feel for programming in Applesoft BASIC. If you want to learn more, get the *Applesoft Tutorial* and the *Applesoft BASIC Programmer's Reference Manual*.



### The LET Statement

The LET statement lets you assign a value to a variable from within a program. **LET BIGNUM = 33333** creates a variable named BIGNUM and assigns the value 33333 to that variable. The *LET* in a LET statement is optional. So, to Applesoft, **LET BIGNUM = 33333** and **BIGNUM = 33333** mean the same thing. Figure 4-2 illustrates the anatomy of a LET statement.

Figure 4-2. Anatomy of a LET Statement



### The INPUT Statement

The INPUT statement lets you assign a value to a variable from the keyboard. An input statement is usually preceded by a PRINT statement that asks a question. Each time the computer sees an INPUT statement, it

- puts a question mark on the screen
- creates a variable with the name given in the INPUT statement
- assigns whatever number or word you type to the variable.

## Getting Your Program Onto a Disk (and Off Again)

You learned enough on the *Getting Down to BASIC* disk to write simple BASIC programs. The next step is to learn how to save your programs on a disk so you don't have to start from scratch each time you sit down at your computer.

There are several activities that work hand in hand with saving programs on a disk: loading programs from a disk, cataloging a disk to see what's on it, and deleting programs from a disk. You'll learn about these four disk related activities, or commands, in this section.

By the Way: These are not BASIC commands. They are ProDOS commands. But they are indispensable to BASIC programmers.

Before you can save a program on a disk, you have to format the disk, so that's a logical place to start this discussion of ProDOS commands.

## Formatting

As you learned in Chapter 3, formatting a disk divides it into sections where information can be stored. BASIC programs use the ProDOS format. If you have a blank disk handy, you might as well practice this important activity right now so you'll have a place to save the programs you write. (If you don't have any blank disks, you can save your first few programs on the *Getting Down to BASIC* disk, which is already formatted for ProDOS.)

### ▲ Warning

Do not format the *Getting Down to BASIC* disk. Just save your programs on it.

The ProDOS formatting program is on the *System Utilities* disk that came with your Apple IIc. Find that disk and follow these instructions. (If you find the instructions a little sketchy, read about formatting in the *System Utilities* section of this manual for further information.)

## Formatting a Disk for BASIC Programs

1. Start up *System Utilities*.
2. Type **(6)** and press **(RETURN)** (to select **Format a Disk** from the Main Menu).

3. Press **RETURN** (to indicate that you'll be using your built-in disk drive to format your disk).
4. Press **RETURN** (to indicate that you want to format your disk for ProDOS).
5. Type your name or any other word (as the name of the disk you're about to format) and press **RETURN**.
6. Take *System Utilities* out of your built-in disk drive, replace it with a blank disk and press **RETURN**. You'll hear some whirring and eventually you'll see the message: **FORMATTING COMPLETE**.
7. If you get the message **OKAY TO DESTROY:**, then the disk you put in was not blank. Select **N** for *no*, replace the disk with a blank disk, and try again.

That's all there is to it.

Once you've got your formatted disk, you can get into the BASIC programming environment, write your program, and save it.

### **Getting Into Applesoft BASIC**

As you've already learned, there are a couple of ways to get into Applesoft BASIC. You can start up *Getting Down to BASIC* and choose the Quit option, or you can start up *System Utilities* and choose the Exit System Utilities option. Either method loads ProDOS and gets you into BASIC.

### **Saving a BASIC Program**

Saving a program is simple. Just put your formatted disk into your disk drive, then type **SAVE** followed by a name you give the program (for example, **SAVE PUZZLE**).

To save a program on a disk in the external drive, type **SAVE**, then the name of the program, then a comma, then D2 (for example, **SAVE PUZZLE , D2**).



## **Naming Programs**

When you store a program on a disk, you give it a filename. Every filename must follow the rules set out by ProDOS. According to these rules, every filename must

- begin with a letter
- be 15 characters or less.

A filename cannot

- contain any spaces
- contain any characters other than letters, numbers, or periods.

## **Running a Program**

To run a program that's stored on a disk, all you have to do is get into Applesoft BASIC, put the disk containing your program into your disk drive, then type **LOAD** followed by the name of the program (for example, **LOAD PUZZLE**). To load a program from a disk in the external disk drive, type **LOAD**, then the name of the program, then a comma, then **D2** (for example, **LOAD PUZZLE, D2**). Then type **RUN** to run the program that's in memory.

A Short Cut: Up to this point, you've used the **LOAD** command to load a program into the computer's memory and the **RUN** command to run the program you've loaded. You can save some keystrokes by typing **RUN** and then the name of the program that's stored on the disk. When you do this, the program is loaded into memory and then executed, all in one step.

### **Important!**

Don't attempt to use commands like **LOAD** and **SAVE** to load or save data files you created with an application program. These commands work only on BASIC programs. The application program you're using will tell you how to save and load data.

## **Cataloging Disks**

After you've written and saved several programs on a disk, you may have trouble remembering what you named each of them. If you find that you've forgotten the names of the programs on your disk, type

CAT. You'll see a display like Figure 4-3 that tells you, among other things, the name of the programs on the disk and how much space they take up.

Figure 4-3. A Typical Catalog

/MYPROGRAMS

NAME	TYPE	BLOCKS	MODIFIED
PUZZLE	BAS	40	<NO DATE>
AGE	BAS	1	<NO DATE>
PRACTICE	BAS	11	<NO DATE>
PAZAZZ	BAS	14	<NO DATE>
PENGUIN	BAS	6	<NO DATE>

BLOCKS FREE: 208                      BLOCKS USED: 72

1

To catalog a disk in the external disk drive, type CAT, D2.

## **Deleting Programs**

In time your disks will accumulate programs that have outlived their usefulness. You can get rid of unwanted programs in order to reuse the disk space by typing **DELETE**, then the name of the program (for example **DELETE PUZZLE**). To **DELETE** a program from a disk in the external disk drive, type **DELETE**, then the name of the program, then a comma, then **D2** (for example, **DELETE PUZZLE, D2**).

**ProDOS Commands:** You may have noticed that commands that deal with the disk or the disk drive (such as **CAT**, **LOAD**, **SAVE**, and **DELETE**) are never preceded by line numbers. That's because each of these commands is a ProDOS command, which is executed immediately after you type it.



## **Creating a Self-Starting Program**

Programs that you buy don't require you to type LOAD and RUN. They just start running when you put the program disk in the built-in disk drive and turn on the power.

If you'd like a program you've written to be a self-starter, you can make it self-starting by following these steps:

1. Format a disk (for ProDOS).
2. Copy the files PRODOS and BASIC. SYSTEM from the System Utilities disk onto your formatted disk. (You'll find instructions for copying files later in this manual.)
3. Copy your program onto the disk and give it the name STARTUP.

Starting up this disk loads ProDOS, puts you into BASIC, and runs your program.

## **It's Your Turn**

This section presents two sample programs along with complete explanations of how they work. If you want to try these programs, first start up *Getting Down to BASIC* (this loads ProDOS into memory), then select the Quit option. This puts you in Applesoft BASIC.

### Converting Miles to Kilometers

Here's an Applesoft program that converts miles to kilometers.

---

Program Line	Explanation
10 PRINT "THIS PROGRAM CONVERTS"	Describes what the program does.
20 PRINT "MILES TO KILOMETERS."	
30 PRINT "HOW MANY MILES"	Prints your request for information. The semicolon instructs the computer to leave the cursor on the current line rather than move it to the next line.
40 PRINT "DID YOU TRAVEL";	
50 INPUT MILE	Puts ? on the screen. Whatever number you type is stored in a variable named MILE. Note that because of the semicolon in line 40, the question mark appears on the same line as the question.
60 LET KILO = MILE/.62137	Creates a variable named KILO, which is equal to MILE (the number you enter) divided by .62137.
70 PRINT "YOU TRAVELED";KILO;	Prints what's inside the first set of quotation marks, then prints the value of KILO, then prints what's inside the quotation marks in line 80.
80 PRINT " KILOMETERS."	
90 END	Signals the end of the program.

Once you've typed the program, you can try it by typing

**RUN**

Here's what you'll see:

```
THIS PROGRAM CONVERTS  
MILES TO KILOMETERS.  
HOW MANY MILES  
DID YOU TRAVEL?3  
YOU TRAVELED 4.82804127 KILOMETERS.
```

Spacing? If the spacing on your screen isn't exactly correct, you may have forgotten to type a space inside one of the PRINT statements. To retype a line, type the line number of the line you want to correct, then type the new statement.

You can save this program on your formatted disk or on the *Getting Down to BASIC* disk by typing **SAVE** followed by a name, like **KILO**. Then, when you want to load the program, simply type **LOAD KILO**.

**Write Your Own Conversion Program:** You can use PRINT and INPUT statements (and this program as a guide) to write programs to convert any measure you can think of. Try Celsius to Fahrenheit or inches to millimeters.

### Crazy Sentences

This program uses INPUT statements to create a crazy sentence. Each time you run the program, the sentence the program creates will be different (unless you type the same responses).

**Clear Memory:** Before you try another program, clear memory by typing **NEW** and pressing **(RETURN)**.



---

Program Line

10 PRINT "COLOR";

20 INPUT C1\$

30 PRINT "ANOTHER COLOR";

40 INPUT C2\$

50 PRINT "NAME";

60 INPUT N1\$

70 PRINT "ANOTHER NAME";

80 INPUT N2\$

90 PRINT

100 PRINT "THE";C1\$;" ROBOT"

110 PRINT "WITH THE ";C2\$;" EYES"

120 PRINT "GRABBED";N1\$;" WHILE"

130 PRINT N2\$;"RAN FOR HELP."

140 END

Explanation

Prints a request for a color. The semicolon tells the computer not to go on to the next line.

Displays ? on the screen. Whatever color you type is stored in the variable C1\$ (pronounced "see-one-dollar"). The word *color* cannot be used as a variable name because it's an Applesoft BASIC reserved word.

Prints a request for a second color.

Displays ? on the screen. Whatever color you type is stored in the variable C2\$.

Prints a request for a name.

Displays ? on the screen. Whatever name you type is stored in the variable N1\$.

Prints a request for a second name.

Displays ? on the screen. Whatever name you type is stored in the variable N2\$.

Prints a blank line.

Prints what's inside the quotation marks interspersed with the colors and names you assigned to the variables.

Signals the end of the program.

After you type **RUN**, your screen will look something like this:

```
COLOR? GREEN
ANOTHER COLOR? PURPLE
NAME? RAINBOW
ANOTHER NAME? LESLIE ANNE

THE GREEN ROBOT
WITH THE PURPLE EYES
GRABBED RAINBOW WHILE
LESLIE ANNE RAN FOR HELP.
```

You can use this same program to create countless different sentences. In fact, you may even want to write a program that creates a whole story!

### **Important!**

When you choose variable names, be sure that you don't choose a word that is an Applesoft BASIC reserved word. Not even part of a variable name can be a reserved word. For example, a variable can't be named **LETTER** because the reserved word *LET* is part of the name.

And don't forget the two-character rule: Applesoft BASIC looks at only the first two characters of a variable name. If, in the Crazy Sentence program, the variables were named **NAME1\$** and **NAME2\$**, Applesoft would have created only one variable.

### **Printing Your Programs on Paper**

If you have a printer connected to your computer, you can print a copy of your program on paper using the **LIST** command. This is useful in debugging programs.

1. Turn on your printer.
2. Type

```
PR#1
```

to direct all information to your printer.

3. Type

#### **LIST**

4. If you're using 40 columns, type

**PR#0**

to turn off your printer and send information back to the screen.

If you're using 80 columns, type

**PR#3**

instead of **PR#0** to turn off your printer and send information back to the screen.

**PR** What? **PR#1** is shorthand for "print to the device attached to slot 1." Other models of the Apple II have slots inside the case where you plug in peripheral devices. Printers are customarily plugged into slot 1. For compatibility with other models of the Apple II, the Apple IIc understands the same shorthand—even though it doesn't have slots.

### **You've Only Begun to Program**

You know enough now to write simple BASIC programs. To go further you need to learn some programming theory—how to divide your task into logical units before you start writing your program. Many schools offer classes in BASIC, and there are hundreds of elementary books on the subject. Look for a book that stresses the structured approach to programming.

### **Other Computer Languages**

BASIC and Logo are just two of the programming languages available for the Apple IIc. The following list briefly introduces a few other popular computer languages available for the Apple IIc.



- **Pascal:** Named after Blaise Pascal, a 17th century philosopher. This language is used in high school and college computer classes to teach programming because it stresses a systematic approach to programming. You break problems down into tasks and subtasks and then write your program in manageable modules.
- **SuperPILOT (Programmed Inquiry, Learning, or Teaching):** This language is designed so that teachers can create computer lessons without learning all the ins and outs of a full-fledged programming language.
- **6502 Assembly Language:** This language is one small step up from the language of electrical impulses that constitutes the native tongue of the Apple IIc. It's a lot harder to learn than languages like Logo and BASIC, but it gives you faster programs (it doesn't need as much translation), and it gives you more control over the operation of the computer.

Your Apple dealer can tell you how to get the software and manuals for these and other computer languages.

Figure 4-4 shows you how the various computer languages relate to each other, to you, and to the machine.

Figure 4-4. Language Hierarchy

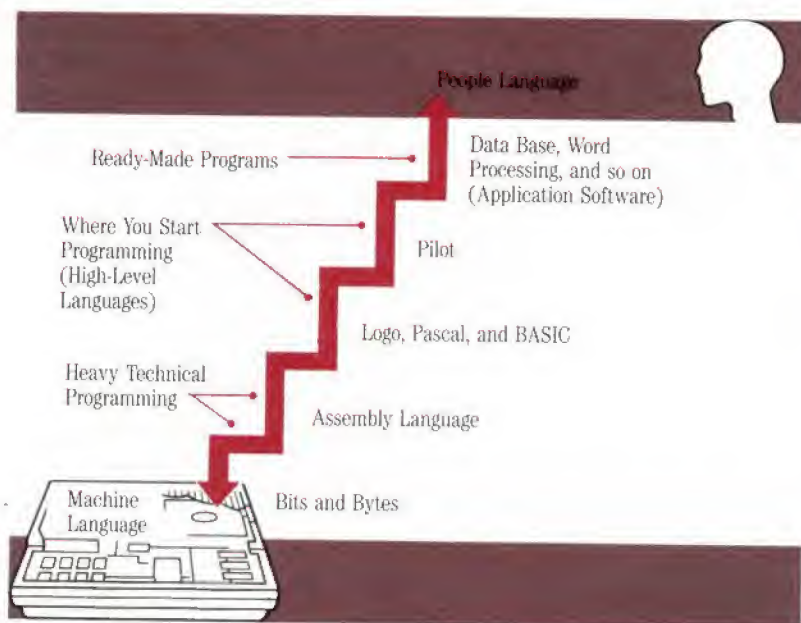
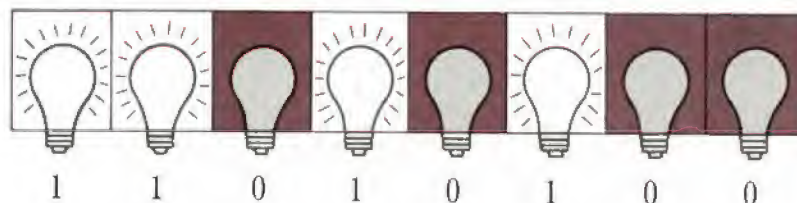


Figure 4-5. Eight Bits in a Byte

### Byte



### Bits and Bytes

*The computer's brain is made up of switches—like light switches—so everything has to be reduced to on and off before the computer can understand it. On is often represented by*

*the number one. Off is represented by the number zero. It takes a string of eight zeros and ones to express each of the letters, numbers, and punctuation marks on the keyboard. Each zero or one in*

*the string is called a bit. Each string of eight is called a byte. See Figure 4-5.*

*One reason early computers filled whole rooms is because it took a separate vacuum tube to hold each zero and one. (The*

## Chapter 4 Summary

---

Writing a computer program involves breaking a task down into small steps and expressing those steps in terms the computer can understand.

### Popular Programming Languages Available for the Apple IIc

Logo	Easy and fun to learn (with lots of emphasis on graphics), yet powerful enough for serious programming. Builds communication skills along with computer literacy.
BASIC	Beginners All-purpose Symbolic Instruction Code is built into the Apple IIc and many other personal computers, so there are lots of people who speak the same language. BASIC is good for beginners because it resembles English and is easy to learn.

### Computer As Calculator

Because BASIC is built into the Apple IIc, you can use your computer as a calculator. Here are mathematical symbols the computer understands:

addition	+
subtraction	-
multiplication	*
division	/

### ProDOS Commands

CAT	Short for catalog. Displays a list of what's on a disk.
SAVE	Stores your program in a file on a disk.

---

*story goes that a moth flew into one of those tubes once and shorted out the entire computer. This gave rise to the term bug, which now means there's something wrong with your program.)*

*Talking this language of zeros and ones gets tedious, so programmers wrote translators (special programs) that allowed them to write instructions in a language more like English, letting the*

*translators convert the instructions into machine language. Programmers still have to break their tasks down into small, logical steps, but they don't have to reduce the steps to zeros and ones.*



LOAD	Transfers a copy of a program on a disk into memory.
DELETE	Removes a program from a disk.

#### BASIC Commands

NEW	Erases whatever is in memory.
LIST	Displays the program in memory.
RUN	Executes the program in memory.

#### BASIC Statements

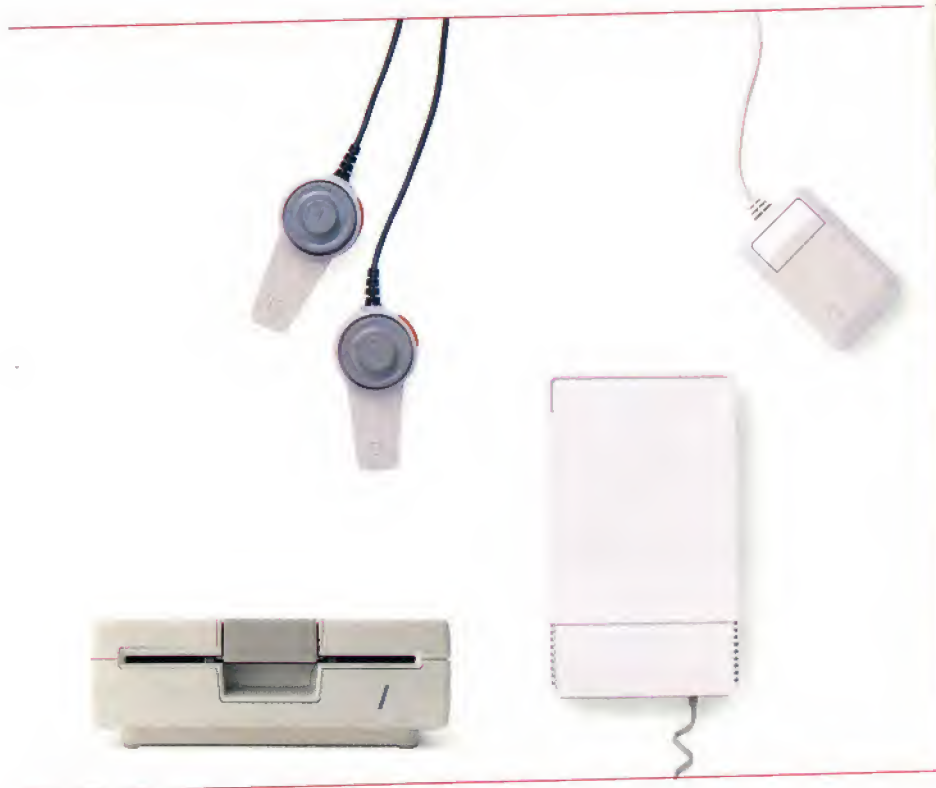
PRINT	Displays information on the screen.
INPUT	Lets you interact with someone using your program.
LET	Defines a variable.
END	Tells the computer the program is finished.

#### Creating a Self-Starting Program

1. Format a disk for ProDOS.
2. Copy the files ProDOS and BASIC.SYSTEM from your *System Utilities* disk onto your ProDOS-formatted disk.
3. Copy your program onto the disk and name it *STARTUP*.

## Chapter 5

## Now What?



By now you've probably thought of lots of ways you can use the Apple IIc to lighten your workload and free up time for a few forays against the space invaders. The next step is to get some specific application programs (unless you plan to write all of your own programs, in which case you should invest in a good, elementary programming book).

If you want to write letters, term papers, or novels, go out and get a word processing program. If you want to catalog your comic book, butterfly, or coin collection, go out and get a data base program. If you have a task in mind, but don't know the type of application program that can handle it, talk to your dealer. Odds are your dealer can help, because there's an application program for almost every task imaginable—from managing pig farms to tracking hurricanes. Each application program comes with a book that tells you how the program works.

**By the Way:** The disks packed with the guide are educational software. *The Apple at Work*, for example, teaches you about word processing, data base, and spreadsheet programs, but it can't be used in place of the application program (AppleWorks) it describes.

---

## Choosing Application Programs

Once you've settled on the type of application programs you want, it's a good idea to invest in a software directory. Software directories describe individual programs in detail and tell you how much they cost.

Build your software collection gradually, the way you build your book and record libraries. And choose software the way you choose books—on the recommendations of friends. If you don't know many people who use computers, join an Apple users group.



### **Users Groups**

Users groups, also known as computer clubs, are a good place to learn programming short cuts and tricks of the computer trade. There's usually a beginner's group, and there are plenty of old hands to help you learn the ropes.

Ask your dealer for the Apple club nearest you or contact

International Apple Core  
908 George Street  
Santa Clara, CA 95050  
(408) 727-7652

### **Computer Magazines**

Computer magazines are another good source of information about software.

### **Computer Books**

There are also a number of excellent books about computers and computer programming. There are 20 new titles a week, so it's impossible to give you a list of all the computer books on the market. Ask your dealer to recommend some books in your area of interest.





























## **Adding Pieces to Your Computer System**

Just as there are all sorts of application programs you can get for your computer, there are dozens of peripheral devices that can make your computer a more powerful machine. Use Table 5-1 to decide which peripheral devices complement the application programs you have in mind.

### **Important!**

If a device requires you to plug something into a slot inside the computer, it's designed for other models of the Apple II; *it won't work with the Apple IIc*. Ask your dealer if you have any questions about whether a particular device will work with the Apple IIc.

Table 5-1. Adding Pieces to Your Computer System

Word Processing	 Monitor	 Printer	 External Disk Drive	
Data Base	 Monitor	 External Disk Drive	 Printer <i>Optional</i>	 Mouse <i>Optional</i>
Spreadsheet	 Monitor	 External Disk Drive	 Printer <i>Optional</i>	 Mouse <i>Optional</i>
Education	 Color TV	or  Monitor		
Games	 Color TV	or  Monitor	 Hand Controls or Joystick	 Mouse <i>Optional</i>
Communication	 Monitor	 Modem	 Printer <i>Optional</i>	
Graphics	 Color TV	or  Monitor	 Plotter	 Mouse <i>Optional</i>
Programming	 Monitor or TV <i>(For elementary programming)</i>	 External Disk Drive <i>(Necessary for Pascal; optional for BASIC and Logo)</i>	 Printer <i>Optional</i>	 Mouse <i>Optional</i>

## Peripheral Devices

---

Should you buy a video monitor? Or can you get by with your TV? What about an extra disk drive? This section will answer these questions (and many more) by describing and illustrating the most popular peripheral devices for the Apple IIc.

### Monitor or Television Set

---

A radio-frequency (RF) modulator makes it possible for a TV set to tune in signals from the computer.

Which display device you use with the Apple IIc depends on what you do with your computer. If you use your computer for elementary programming or for playing computer games, you can use your television set (with an RF modulator) for a display device. But if you plan to use your computer for word processing, financial planning, or some other business application, a video monitor is a must.

Televisions can't display 80 characters on a line clearly, the way monitors can. They can display only 40 characters on a line. While 40 characters a line is fine for some applications (games and educational programs), it's too narrow for business letters or electronic spreadsheets. Figure 5-1 gives examples of 40-column and 80-column displays.



Figure 5-1a. 40-Column Display Versus 80-Column Display. This is a 40-column display.

File: holiday

REVIEW/ADD/CHANGE

=====

Dear Pat and Dick,

Sure is good to be writing you again. I  
can't believe it's been a year!

About the biggest news here is that we  
bought an Apple computer. In fact, I'm  
using it right now to write you this  
letter. And you know if butter fingers  
me can get it to work, it's got to be  
easy to use!

Love,

Harry and Nan

Figure 5-1b. 40-Column Display Versus 80-Column Display. This is an 80-column display.

```
File: holiday                REVIEW/ADD/CHANGE                Escape: Main Menu
=====
Dear Pat and Dick,

Sure is good to be writing you again. I can't believe it's been a year!

About the biggest news here is that we bought an Apple computer. In
fact, I'm using it right now to write you this letter. And you know if
butter fingers me can get it to work, it's got to be easy to use!

Nan and the kids are doing fine. Nan's been writing a lot of articles and
I'm still killing myself at the office. In my "spare" time I'm managing
Jimmy's ball team and let me tell you, those kids are GOOD.

How are your kids, by the way? I'd really like to hear from you. Why not
buy a computer? It makes letter writing a breeze. Anyway, happy new
year and do keep in touch.

                                Love,

                                Harry and Nan
```

Monochrome video monitors come in three varieties: black and white, black and green, and black and amber. If you need or want a sharp, clear picture and color, you might want to look into a color monitor. Color monitors cost more than monochrome monitors, but they're ideal for computer graphics and for displaying business charts and graphs.

If you alternate between using a monitor and a television, make sure to set the 80/40 Column switch before starting up the program. The switch must be set to 40 columns (down) for TV and can be set to 80 columns (up) or 40 columns (down) for monitor. If you discover that the switch is set incorrectly after starting a program, it's no big deal. Just change the setting and restart the computer.

For how to restart the computer, see "Starting Up With the Power On" in Chapter 1.



**40 or 80 Columns:** Some programs are written in the 40-column format and will appear in the 40-column format even if you have the 80/40 Column switch set to 80 columns. Other programs are designed exclusively for the 80-column format and won't function properly if the switch is set to 40. In other words, you can't use such programs if a television set is your only display device.

Finally, some people prefer the 40-column display for some programs even though they have a monitor and could display the program in the 80-column format. Experiment with the switch and you'll quickly discover your options and preferences.

Figure 5-2. The Apple Imagewriter and Scribe



With serial printers, the computer sends information to the printer one bit at a time (it takes eight bits to make a byte, or one character). The computer sends parallel printers information eight bits at a time.

## Printer

A printer creates a paper copy of information you create with your computer. You can use a computer without a printer, but it's not convenient or practical, for example, to mail your letters on disks. For some people, a printer is a must.

Printers come in a variety of prices and vary in print speed, quality, and loudness. Ask your dealer for a demonstration before you buy. Printers also vary in degree of compatibility with your computer. Make sure the printer you buy works with the Apple IIc—get a demonstration with the programs you'll be using—before you bring it home.

**Make Sure It's Serial:** The Apple IIc is designed to work only with serial printers. You can't use a parallel printer.

Figure 5-2 shows two types of printers you can connect to your Apple IIc: the Apple Imagewriter and the Apple Scribe®.

The Imagewriter is a dot matrix printer. Dot matrix printers form characters with patterns of dots. They're fast, affordable, and ideal for graphics. They're fine for personal letters and memos. The main advantage of dot matrix printers is that you can use a wide variety of typefaces and type sizes.

The Scribe is a thermal transfer printer, which means that letters are essentially *burned* on paper. Thermal printers are quiet and cheap. The Scribe can print in four colors (with the optional color ribbon), and, unlike other thermal transfer printers, it does not require special paper.

## Important!

Before using a printer with the computer, be sure to read the section on configuring serial ports in the utilities section of this book.



**▲ Warning**

If you alternate between plotter and printer in port 1, make sure the power is off before you make the switch.

Figure 5-3. The Apple Color Plotter



**Plotter**

Plotters can reproduce graphs, charts, floor plans, and other graphics you create with your computer. Figure 5-3 shows you the Apple Color Plotter.

Make sure the plotter you choose has a serial interface like the Apple Color Plotter.

**Second Disk Drive**

A disk drive is an indispensable part of your computer system—that's why one is built into your Apple IIc. It's convenient to have a second disk drive so that you can keep your application program disk in the built-in disk drive (drive 1) and your data disk in drive 2. (A few programs require you to have two disk drives.)

Having two disk drives also makes it easier to make copies of data disks—a must, since disks are perishable. Figure 5-4 shows you a disk drive you can attach to your Apple IIc.

Figure 5-4. Disk Drive



**Mouse**

So far you've been communicating with the computer through the keyboard. Some programs also let you communicate with the computer by using the mouse (see Figure 5-5). Rolling the mouse across your table or desk moves a pointer on the screen. With some programs, you can use the mouse to draw pictures. With other programs, you can use the mouse to select topics from a menu (move the pointer to the topic you want and press the mouse button).

Figure 5-5. The Apple Mouse



Figure 5-6. Modem



### **Modem**

A modem, short for **modulator/demodulator**, links your computer by telephone to other computers and information services. If you plan to tap into a large computer library for stock quotes, medical or legal research, or use your computer for electronic banking, you'll need a modem and a communications program like Apple Access II.

Different modems send and receive information at different speeds. The speed is measured in **bits per second (bps)**, often referred to as **baud**. The most common baud rate is 300. You can also get modems for the Apple IIc that send and receive data at 1200 baud. They cost more, but they're four times faster—a valid consideration because you're often paying long distance phone rates. (Some programs can't handle 1200 baud, so make sure your program can cope with the higher speed before you buy the 1200 baud modem.) Figure 5-6 shows a popular modem you can attach to your Apple IIc.

Figure 5-7. Hand Controls and Joystick



### **Joystick or Hand Controls**

If you plan to use your computer for games—and who doesn't occasionally—you'll want to invest in a joystick or hand controls. Not all games require a joystick or hand controls, but the vast majority do.

Hand controls and joysticks control the movement of creatures or objects in game programs. With hand controls, you control movement by turning a pair of knobs—one in each hand; with a joystick, you maneuver an airplane-style joystick. Both hand controls and joysticks have buttons you press to fire torpedos, throw forward passes, or anything else the programmer can dream up. Figure 5-7 shows you what the hand controls and joystick look like.

### **You're Not Alone**

As you build your software library and add peripheral devices to your computer system, you'll occasionally hit stumbling blocks. Where can you turn? This book is a good place to start. If you can't find the



answer here, talk to your dealer. Your dealer is the best source of information on the Apple II family of computers. And don't stop there—let us know what the question or problem was by filling out the Tell Apple card at the back of this guide.

## You Can Take It With You

---

The Apple IIc is a portable computer—you can carry it with you from home to work and back again. And this is a portable owner's guide. You can carry the lessons you've learned into every session at the computer. And you can return to the guide for refresher courses any time you need them.

Now that you've finished the guide, the next step is to

- get an application program and read the manual that came with it, or
- get a book and learn programming.

Whether you decide to write your own programs or use application programs, you'll need to know how to format disks and how to make copies of disks. These and other utilities are explained in the second part of this book. Some application programs have utilities—like copying, deleting, and formatting—built in. So you might want to check the manual that came with the application program and follow the instructions there.

From here on out, the best teacher is experience. You won't really know what you know, or what you don't know, until you've written your first program or composed your first letter with a word processing program. Your most unforgettable lessons will come from trial and error. Don't hesitate to ask friends for help, or to offer help when experience has turned you into a veteran. That's what it's all about—getting personal about computers.

Thanks for your time. Enjoy your computer.



## Chapter 5 Summary

---

### Popular Peripheral Devices

Display Device	A video monitor or television set. It displays instructions from the program to you, and shows you what you've typed into memory.
Printer	Produces a paper copy of information you create with the computer.
Plotter	Draws a paper copy of the graphics you create with the computer.
Disk Drive	Writes information on disks and reads information from disks.
Mouse	Moves a marker across the screen in some programs.
Modem	Links your computer to other computers and information services by phone.
Joystick and Hand Controls	Move objects and creatures around the screen.

### Where to Go for Help and Information

- Users groups
- Software catalogs
- Computer books and magazines

---

## Appendix A

---

## Ask Apple



Now that you've spent some time with the Apple IIc, you probably have lots of questions that never occurred to you before you actually tried out a computer. In this section, the questions new Apple users frequently ask are answered. If you have other questions, ask your dealer, people at an Apple users group, or send your inquiry to one of the Apple magazines.

#### Can I run all Apple II and Apple IIe software on my Apple IIc?

Yes, you can run the overwhelming majority of Apple II and Apple IIe software. You can't use software that requires more than two disk drives or software that requires a peripheral card. The Apple IIc has no slots, so it can't run software that uses devices that must be connected through cards in slots. It also can't run software that uses early DOS (3.1, 3.2).

#### Can I run software for other computers on the Apple IIc?

The software that runs on the Apple IIc is software that uses one of Apple's operating systems: ProDOS, DOS, or Pascal. Software written for other computers doesn't use these operating systems and consequently won't work on the Apple. You will find, however, that almost all major software publishers have versions of software that run on the Apple IIc.

Sometimes I hear horror stories about people typing pages and pages of information and then having it disappear. How can I prevent this from happening to me?

Save! Save! Save! Every program has a way for you to transfer information from the computer's memory to a file on a disk. Once stored on a disk, information is safe, or at least a lot safer than it is when it's only in your computer's memory. That's because information stays in memory only as long as the power is on and the computer is working properly. Power surges, electrical failures, computer failures, and klutzy friends who trip over power cords are rare, but they invariably happen just after you've written your cleverest program or most heartfelt letter. By saving frequently to a disk (at least every 10 minutes) you're guaranteed that, no matter what, you won't lose too much valuable information. But saving to a disk is only half the secret. At the end of the day, always make a backup copy of your disk. No matter how careful you are, disks get damaged. The only way to guard against a damaged disk is to have a spare copy.



### Can software break?

Yes, sometimes software just doesn't work the way it's supposed to. But then again, sometimes hardware doesn't work the way it's supposed to, and still other times, users don't work the way they're supposed to. What this means is that, although software may appear broken, the problem often is with hardware or, believe it or not, the user. If you think your software is broken, try reading the manual. It's possible that the software is meant to work the way it's working. If, after reading the manual, you still think the software is not working correctly, do a repeat test: Note the error and then follow the same sequence of steps to see if you can get the error to happen again. Assuming it does, your next task is to figure out whether the problem's with a piece of hardware, such as the computer or disk drive, or with the software. Try running other programs on your computer. If they also don't work properly, chances are that hardware is the problem. If you try running the broken software on your dealer's computer and have the same problem, you probably have a real software bug on your hands. Once you've caught a bug, report it to your dealer. He may have a patch (a corrected piece of software), or he may be able to help you work around the problem. If your dealer can't help, contact the software publisher directly; many have toll-free telephone numbers.

### How much do I need to know about operating systems?

Unless you're planning on some heavy-duty programming, using a general utilities disk is the closest you need to get to an operating system. If, on the other hand, you've decided that programming is for you, you'll probably need more in-depth knowledge. If you'll be doing BASIC programming, read *BASIC Programming With ProDOS* and the *ProDOS Technical Reference Manual*. Some BASIC programmers may want to write programs using DOS, the operating system Apple used before ProDOS. If you want to write DOS programs, you'll need to purchase the *DOS User's Kit*. Finally, if you want to write Pascal programs, you'll need the Pascal operating system and the accompanying manual. Logo uses the ProDOS operating system; the Logo manuals explain how to use ProDOS with Logo.

### What's booting?

In computer lingo, *booting* means starting up your computer. When you turn on the power, a built-in program (the Monitor program) is put into memory, where it turns on the disk drive. The disk drive then

transfers the startup program on the disk to the computer's memory. All this must happen before the computer is ready to work. So, quite literally, booting is letting the computer pull itself up by its own bootstraps, which is how the term originated.

**Is my Apple very fragile? I keep thinking I'm going to break it.**

Your Apple is about as fragile as your television set or stereo. You will never break your Apple by pressing the wrong keys, just as you won't break your TV by turning to the wrong channel.

**Are disks fragile?**

Yes, believe it or not, disks are a lot more susceptible to damage than your computer. In fact, damaged disks are probably the greatest cause of what people think is a broken computer or broken software. Dust is a disk's greatest enemy. To guard against it, always keep disks in their envelopes. Also, keep disks away from extreme heat, sunlight, liquids, and anything that contains a magnet, like a telephone. It's best to store disks in a disk holder. (If you don't have a special disk holder, a shoe box works fine.) Finally, when preparing disk labels, write them first, then stick them on the disk. If you must write on a label that's already on a disk, make sure you use a felt-tip pen, rather than a ball-point pen. Using a pencil or ball-point pen could dent the surface of the disk.

**Is it OK to use both sides of a disk?**

Not usually. The disks that are part of the guide are specially made for two-sided use.

**Do I need an external disk drive?**

No, you can use almost all software with one disk drive. A second disk drive just makes using your computer a little easier. The time when a second drive comes in most handy is when you're making backup copies of disks. If you copy a disk using only one disk drive, you have to do a lot of swapping—that is, swapping your original and backup disks in and out of the built-in disk drive. If you have an external disk drive, you can put your original disk in one drive, your backup in the other, press a few keys, and then let your computer do the work.

**How much electricity does my Apple use?**

Your Apple IIc system, complete with monitor, uses less electricity than a 100-watt light bulb.



Should I turn off my Apple after using it?

If you're going to be away for more than an hour or two, it's a good idea to turn off your computer, just so you don't waste electricity. If you're just taking a stretch or grabbing a drink, leave your Apple on (but save what you're working on before you get up).

Do you recommend opening up the Apple IIc so I can see how it works?

Absolutely not. First of all, opening up your Apple IIc voids your warranty. Second, your computer's innards aren't much more interesting than your toaster's. If you want to learn how the Apple IIc works, start up *The Inside Story* disk. It gives you some idea of what the inside of the computer looks like and what its parts do. Apple IIe and II Plus owners need to open their computers to attach peripherals, like printers and modems. The Apple IIc lets you connect peripherals without opening it up.

Do I need a power surge protector to make sure my computer doesn't blow up?

First of all, computer blow-ups and smoke-outs are things of the past. Today, about the most dramatic result of a power surge or electrical storm is lost data. Even losing data is extremely rare, however, since your computer has a built-in mechanism to guard against changes in electrical power. The only people who may want to invest in a protector are those who are extremely cautious and those who live in areas that are particularly prone to electrical storms, hurricanes, and electrical failures.

Do I need to touch type to use a computer?

No, you don't need to know how to touch type. Lots of people who use the hunt-and-peck method (that is, they hunt for each key as they need it) do just fine. In fact, hunt-and-peckers report greatly increased typing speeds after a few days with a computer. If you want to learn to touch type, you may want to buy a typing program. These programs give you typing instructions right on the screen.



How do I know whether to set the Apple IIc display to 40 or 80 columns?

If you're using a television, set the Apple IIc display to 40 columns. That's because televisions don't have fine enough resolution to display 80 columns worth of information. If you're using a monitor, set the Apple IIc 80/40 Column switch to 80 columns. Many application programs, particularly word processing and spreadsheet programs, require an 80-column display.

What's K and how much do I need?

To understand what a K or kilobyte is, you first need to know what a byte is. A byte is the space one letter or digit takes up in the computer's memory. A kilobyte is equal to 1024 bytes. That means that a computer with 128K, like the Apple IIc, can store a little more than 128,000 characters in its memory. The more kilobytes your computer has, the more information it can store and the larger the programs it can run. 128K is enough memory for just about all home and business applications.

Is it bad for your eyes to look at the screen for too long?

We don't know of any studies that have found that staring at a monitor is harmful to your eyes. Some people do, however, report getting headaches or eye strain after lengthy tête-à-têtes with their computer. Current thinking is that these symptoms are caused by sitting in the same position for long periods rather than from the way information is displayed. In any event, it's a good idea to get up and stretch, just to give your eyes a rest and your body a chance to get moving.

How did Apple get its name?

The name *Apple Computer* was chosen late one afternoon as Steve Jobs and Steve Wozniak, Apple's founders, faced the deadline for filing a Fictitious Name Statement, part of the business licensing procedures. After volleying names back and forth with Wozniak for hours, Jobs looked at the apple he was eating and decided that, unless he or Woz arrived at something better by five o'clock, they would call the company Apple. Five o'clock came and went; Apple was the new company's name.

Is there such a thing as the Apple I?

Yes. The Apple I was the first computer that Steve Jobs and Steve Wozniak created. The computer had no case, and you had to purchase your own keyboard. There were no disk drives back then, so all programs had to be stored on cassette tape. Really, though, the Apple I was the most user friendly computer of its day since it required only a minimum of time and technical know-how to put it together. About 200 Apple I's were built. The computer was designed at night in a lab at Hewlett-Packard and manufactured in the garage of Steve Jobs' parents. Unless you're a collector, the Apple I isn't much of a bargain; the computer sells for between \$10,000 and \$15,000.

Did the Apple I have a manual?

You bet. It was about eight pages long.

Who designed the Apple logo?

The Apple logo was designed by Regis McKenna, a Silicon Valley public relations firm. The original Apple logo was a design of Newton under an Apple tree. But Newton didn't lend himself to reproduction, so Regis McKenna was called in to create an insignia that could be replicated more easily.

Should I worry if I find myself talking to my Apple IIe?

No. Lots of people talk to their computers, especially when they're just learning to use them. What's nice about the current crop of computers is that they can't understand what you're saying. In a decade or so, you may have to watch your language.

## Appendix B

## Troubleshooting





Making mistakes is part of the learning process. In fact, if you don't make a few mistakes, you're not being very adventurous, and you're probably typing too slowly. So don't be afraid of a few beeps and blinking error messages. It comes with the territory.

Symptom	Cause	Remedy
<b>SYNTAX ERROR</b> on the screen.	Some programs require all your entries to be in uppercase. You typed something in lowercase, or the program doesn't recognize the command or instruction you typed; maybe it's misspelled.	Press <b><u>CAPS LOCK</u></b> down and type your entry again. Check your typing. If you made a mistake, retype the command.
<b>I/O ERROR</b> on the screen.	You put the wrong disk in the disk drive, probably a blank (unformatted) one, or there's a poor connection between your computer and your printer or external disk drive.	Take the disk out of the disk drive and see if it's the one you thought it was. If it's not, replace it, and repeat what you were doing when you got the error message. Check to make sure your printer and disk drive are securely plugged into the computer.
Nothing happens when you turn on the power. (The built-in disk drive doesn't make a sound.)	The power cord isn't plugged into the wall or into the computer.	Turn the power switch off, then make sure the power cord is plugged into a power source and plugged into the computer. Then try again.
Nothing appears on the screen when you turn on the power (even though the Disk Use light comes on and you hear a whirring sound from the disk drive).	The monitor isn't turned on, the monitor isn't plugged in, or monitor contrast or brightness isn't adjusted properly.	Turn on the monitor. Plug in the monitor. Adjust the monitor contrast or brightness knob.
<b>CHECK DISK DRIVE</b> appears on the screen.	There's no disk in the built-in disk drive, or the disk in the built-in disk drive isn't formatted.	Put a program disk in the built-in disk drive and repeat the startup procedure.

Symptom	Cause	Remedy
Blurry screen image with very tiny letters.	You are using a television set for a display device and the 80/40 Column switch above the keyboard is set to 80 (the monitor setting).	Change the 80/40 Column switch to 40 (down) and start up again.
Blurry 80-column display on a television set, even though the 80/40 Column switch is set to 40.	Some Apple IIe application programs don't check the 80/40 Column switch setting and assume that you want 80 columns.	Use a monitor (if available) or get software designed for the Apple IIc.
Screen is only half filled with characters.	You are using a monitor for a display device and the 80/40 Column switch above the keyboard is set to 80 (the television setting) and the program is written for 40 columns.	Change the 80/40 Column switch to 40 (up) and start up again.
Scrambled Text (characters run off the edge of screen).	Your 80/40 Column switch is set to 40 (down) and the program is designed for 80 columns.	If you have a monitor, set the 80/40 column switch to 80 (up) and start again.
Unusual characters on the screen when you start up an application program designed for earlier models of the Apple II.	The application program is trying to use memory space now reserved for mouse firmware.	Use the application program on an Apple IIe (if available) or get software designed for the Apple IIc.
Screen image is too bright or too dim.	Monitor contrast or brightness isn't set properly.	Adjust the monitor contrast or brightness knob until the display is easy to read.
Sound is too low or too loud.	The speaker volume isn't set properly.	Adjust the speaker volume control on the lower left side of the Apple IIc until the sound is set to a comfortable level for you (and those around you).
Program disk won't start up; disk drive keeps whirring.	Disk is bad.	Press <b>CONTROL-RESET</b> to stop disk drive. Contact the dealer or manufacturer.



---

**Symptom**

Program disk won't start up.

**Cause**

Built-in disk drive needs to be aligned or adjusted.

**Remedy**

Have your dealer adjust the disk drive. In the meantime, you can start up the disk from the external disk drive (if you have one) by following these steps:

1. Put the program disk in the external disk drive.
2. Hold down **(CONTROL)** while you press **(RESET)**.
3. When you see **1**, type **PR#7** and then press **(RETURN)**.

Information not recording on the disk; unable to load previously saved information; unable to catalog data disk.

Disk is not being settled properly in the disk drive.

When you insert a disk into the drive, be sure that it is settled into place. Close the door completely.

See "Verify that a Disk Is Readable" in Chapter 2 of the *System Utilities* section.

---

## General Troubleshooting Tips

Specific application programs have their own set of error messages. The messages are either self-explanatory or explained in the manual that came with the application program.

Some programs are better than others at shielding you from disaster. And some programs are friendlier than others when it comes to error messages. Friendly programs will tell you what you did wrong and how to fix it. Unfriendly programs will beep and display a cryptic message. If you run into an unfriendly program that doesn't tell you what to do about your mistake, try these remedies:

- Check your typing.
- Press **(CAPS-LOCK)** down. (Some programs accept entries only in uppercase.)



- Check the manual to see if you did the procedure correctly.
- Get help from someone who knows how to use the program.
- Get help from your dealer.

## Stopping a Runaway Program

---

Most programs give you an easy way out. If your program doesn't have a Quit option on the menu, try these escape methods (until you find the one that works):

- Type **Q** for Quit.
- Press **(ESC)**.
- Hold down **(CONTROL)** while you press **(C)**.
- Press **(CONTROL)-(C)** and then **(RETURN)**.
- Hold down **(CONTROL)** while you press **(RESET)**.
- Hold down **(C)** and **(CONTROL)** while you press **(RESET)**.
- Turn off the power.

## Programs That Won't Start Automatically

---

If you put one of your own disks in the built-in disk drive, start it up, and find yourself staring at a blank screen, try this:

Type **CATALOG** and press **(RETURN)**.

CATALOG is a special word, or command, that tells the computer to produce a list of what's on the disk. If this command produces a list of programs like the one in Figure B-1, you can run any of the programs with the letter *A* in front of them by typing **RUN**, the name of the program, and then **(RETURN)**. For example, you might type **RUN BINGO** and then press **(RETURN)**. You can run some of the programs with the letter *B* in front of them by typing **BRUN**, the name of the program, and then **(RETURN)**. For example, you might type **BRUN BOZO** and then press **(RETURN)**.

You're most apt to run into this situation if you're using programs written by friends. Most packaged programs start by displaying a menu or a set of instructions.

Figure B-1.A Typical Catalog

---

DISK VOLUME 254

A 006 HELLO  
A 031 GO FISH  
A 040 GUNNY SACK  
A 060 SPACE OUT  
A 045 BINGO  
B 039 BOZO

]

## Appendix C



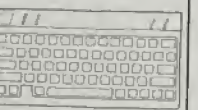






## Apple II Family Differences





There are thousands of programs for the Apple II family of computers. You can use most of them on the Apple IIc if you take into account

Table C-1. Apple II System Differences

	Memory	Keyboard	Micro-processor	Peripheral Device Interface	
Apple II Plus	48K Expandable to 64K with language card in slot 0.	51 Keys  Uppercase Only.	6502	8 Slots (For peripheral device interface cards.)	Recommended Slots Slot 0 Language Card Slot 1 Printer Slot 2 Modem Slot 3 80-Column Slot 4 Other Device Slot 5 Other Device Slot 6 Disk Drive Slot 7 Co-processor
	64K Expandable to 128K and beyond with memory card.	63 Keys  Uppercase and Lowercase.	65C02 (Late Model) 6502A (Early Model)	8 Slots (For peripheral device interface cards.)	Recommended Slots Slot 1 Printer Slot 2 Modem Slot 3 Leave empty if you have a card in Aux. Connector. Slot 4 Mouse Slot 5 ProFile Slot 6 Disk Drive Slot 7 Co-processor Aux. Conn. Extended 80-Column Card
Apple IIc	128K Not expandable.	63 Keys  Uppercase and Lowercase. Dvorak Option.	65C02	6 Ports (Interfaces for most popular peripherals are built into computer.)	Icons Ports  Joystick/Mouse/Hand Controls  Modem  RF Modulator (for TV)  Monitor  External Disk Drive  Serial Printer

the differences between the Apple IIc and the rest of the Apple II family. These differences are summarized in Table C-1.

Hardware Differences				Languages in ROM	Operating Systems
120 Chips	Open System (Can accommodate a wide range of devices and co-processors.)	V-shaped Openings (Accommodate a variety of cable clamps.)	Additional Features <ul style="list-style-type: none"> <li>■ Tape Recorder I/O</li> <li>■ Slots for Peripherals</li> <li>■ Built-in Speaker</li> </ul>	Applesoft BASIC	DOS 3.2 DOS 3.3 ProDOS CP/M (with Card) Pascal
31 Chips  Fewer chips means greater reliability, cooler system, supports MouseText.	Open System (Can accommodate a wide range of devices and co-processors.)	Rectangular Openings (Sized for standard DB-style connectors.)	Additional Features <ul style="list-style-type: none"> <li>■ Tape Recorder I/O</li> <li>■ Slots for Peripherals</li> <li>■ Built-in Speaker</li> </ul>	Applesoft BASIC	DOS 3.3 ProDOS CP/M (with Card) Pascal MS-DOS (with Card)
38 Chips  Fewer chips means greater reliability, cooler system, supports MouseText.	Closed System (Can accommodate serial devices and standard peripherals.)	Ports (For connecting peripheral cables.)	Additional Features <ul style="list-style-type: none"> <li>■ Built-in Disk Drive</li> <li>■ 80/40-Column Switch</li> <li>■ Language Switch (for Dvorak)</li> <li>■ Volume Controls</li> </ul>	Applesoft BASIC	DOS 3.3 ProDOS Pascal



## Memory Capacity

---

The Apple IIc has 128K (or 131,072 bytes of RAM, random-access memory)—twice the memory capacity of the standard Apple IIe. This means the Apple IIc has the memory capacity to run all software designed for other models of the Apple II, but other Apple II's may not be able to run software designed for the Apple IIc.

## Additional Features

---

The Apple IIc has built-in interfaces for peripheral devices. These are called ports. The Apple IIe has slots for peripheral cards.

A **peripheral card** is a printed circuit board (similar to the main logic board, only smaller).

The Apple IIc has built-in 80-column capability, a built-in disk drive, and a built-in connector for one additional disk drive. It also has connectors for a serial printer, plotter, or modem. These built-in connectors are called ports.

Other models of the Apple II have slots, long narrow connectors, inside the computer where **peripheral cards** are plugged in to connect disk drives, printers, and other devices to your computer. Printers are generally connected through a card in slot 1, modems through slot 2, disk drives through a disk controller card in slot 6.

Programs written for other Apple II's often ask for the slot number of your printer or disk drive. The Apple IIc doesn't have slots, but you can use these programs by supplying the slot number that corresponds to your printer, modem, or disk drive port:

Device in Port 1	Slot 1
Device in Port 2	Slot 2
Built-in Disk Drive	Slot 6, Drive 1
External Disk Drive	Slot 6, Drive 2

Because other models of the Apple II don't have built-in disk drives, programs and manuals written for those models distinguish between the startup drive and other drives by number. The startup drive is drive 1.

The controller card that connects disk drives to the computer on earlier Apple II's can accommodate two disk drives. Programs distinguish between the two drives connected through slot 6 by drive number.



**Starting From Drive 2:** If you ever have trouble starting up a program from the built-in disk drive, you can start a program from the external drive, drive 2, by following these steps:

1. Put the program disk in the external drive.
2. Hold down **(CONTROL)** while you press **(RESET)**. (This turns off the built-in disk drive.)
3. Type **PR#7** and press **(RETURN)**. (This turns on the external disk drive, drive 2.)

(This procedure works only for ProDOS-based programs.)

Some printers designed for other models of the Apple II require you to set certain switches on the card that plugs into the computer. The printer interface is built into the Apple IIc, so you can't set the switches manually, but you can do the equivalent using a program described in the utilities section of this book.

## Keyboard

---

You couldn't type lowercase letters on the Apple II and Apple II Plus, so programs written for those machines only recognize uppercase letters. Those programs will run on your Apple IIc when you press down **(CAPS LOCK)**.

The Apple IIc keyboard is exactly the same as the Apple IIe keyboard except for the location of **(RESET)**, so you should have no problem using Apple IIe programs on the Apple IIc. But both the Apple IIc and the Apple IIe have some keys that the Apple II and Apple II Plus didn't have (**(⌘)**, **(⌘)**, **(↑)**, and **(↓)**). Older programs haven't taken advantage of these keys, but you can still run the older programs on your Apple IIc.

The Apple II and Apple II Plus have a REPT key that you could press down to make other characters repeat. The Apple IIc and Apple IIe keys repeat automatically if you hold them down.



## Standard Features

---

- 65C02 eight-bit microprocessor
- 128K bytes of RAM
- 16K bytes of ROM
- Applesoft BASIC in ROM
- Disassembler and machine language Monitor program in ROM
- Built-in disk drive with controller for second disk drive (slot 6 equivalent in Apple IIe)
- 80-column display (built-in AUXILIARY slot equivalent in Apple IIe)
- Built-in uppercase and lowercase character display
- 63-key keyboard
- Built-in speaker with volume control
- Hand control/joystick/mouse capability
- Built-in serial interface for printer (slot 1 equivalent in Apple IIe)
- Built-in serial interface for telephone modem (slot 2 equivalent in Apple IIe)
- Color graphics capability
- 12-volt internal power supply
- Power transformer in power cord

## Languages Available From Apple

---

- Applesoft BASIC (built in)
- Pascal
- FORTRAN
- SuperPILOT
- Logo
- 6502 Assembly Language



## Operating Systems Available

---

- ProDOS
- DOS 3.3
- Pascal

## Popular Accessories

---

- Mouse
- Color or monochrome monitor
- 5 1/4-inch disk drive
- Printer
- Telephone modem
- Hand controls, joystick
- Color plotter
- RF modulator

For technical information, see the *Apple IIc Reference Manual*.



To help you maximize the performance you'll get from your system, Apple Computer, Inc. has established a worldwide network of full-support dealers. Your local dealer has a complete package of services to offer you. Each has an Authorized Service Center with specially trained technicians. Each center is equipped with the latest diagnostic programs and an inventory of replacement parts so you'll get fast and efficient service.

If you need answers to technical questions or information about product updates, your full-support dealer can help you. Apple's Technical Support organization backs each dealership to assure prompt, reliable assistance.

---

## Service

If service is required, you should take the system (or Apple product) to your dealer. If you have moved, take it to the nearest Authorized Service Center.

There are more than 2100 Authorized Service Centers throughout the world. For the location nearest you, call (800) 538-9696 in the United States or write

Apple Computer, Inc.  
Attn: Customer Relations  
20525 Mariani Avenue  
Cupertino, CA 95014

During the initial warranty period, your dealer will repair or replace, at no charge, any Apple-manufactured product that proves to be defective. Apple also offers the AppleCare<sup>SM</sup> Carry-in Service Agreement, which will keep this same protection in force for an additional year. This coverage is available through your full-support dealer. (See "AppleCare" for information.)



## Support

---

Become thoroughly familiar with your manuals; then if you still have questions, call on your dealer for assistance.

If you have a question that your dealer is unable to answer, ask him to refer the question to Apple Technical Support. Apple Technical Support provides your dealer with Technical Notes, which answer commonly asked questions, and access to technical support specialists.

Your dealer has the latest information on new hardware and software products and will keep you informed about any product updates. If you want to upgrade your system, your dealer can help you select compatible components.

For service and support, look to your full-support dealer!

## AppleCare

---

When you first purchase your Apple computer, you are protected by a 90-day warranty. So you don't pay for parts or labor if a repair is needed; there are no unanticipated service expenses. You can add an additional year to this protection with our fixed-cost, carry-in service plan—AppleCare. It combines convenient service with fast turn-around.

AppleCare Carry-In Service is the lowest-priced service package in the industry. And your AppleCare agreement will be honored at all Apple Authorized Service Centers within the country of purchase—added insurance should you relocate. Local service means time saved in getting your Apple back to work. Ask your Apple dealer for details.

You may purchase AppleCare at any time. But for uninterrupted protection, it's a good idea to buy it along with your system. Besides providing you with the most complete coverage, purchase with your system avoids an owner-paid dealer inspection of your system if your 90-day warranty has expired.

AppleCare is available through your Apple dealer. Protect your Apple—ask for AppleCare.



---

# System Utilities



---

# Contents

## CHAPTER 1

Introduction	1
Using the Utilities Disk	3
Hands-On Introduction to Utilities	3
Starting Up	4
Duplicate a Disk	6
Built-in Disk Drive and External Disk Drive	8
Built-in Disk Drive Only	9
Finishing Up	11
Now What?	11

## CHAPTER 2

General Instructions	13
Getting Help	14
Selecting From a Menu	16
Selecting the Disk Drive	16
Selecting Files	16
Naming Disks and Files	19
Defaults	19
Making Your Escape	19
Quitting	20

## CHAPTER 3

The Utilities	21
Copy Files	22
Delete Files	22
Rename Files	22
Lock/Unlock Files	22
Duplicate a Disk	23
Format a Disk	23
Formatting When You Don't Know the Operating System	24



Identify and Catalog a Disk	25
Advanced Operations	25
Set the Prefix (ProDOS Only)	27
Create a Subdirectory (ProDOS Only)	27
Verify That a Disk Is Readable	28
Change a Disk's Format	28
Configure the Serial Ports	28

## CHAPTER 4

Configure the Serial Ports	29
Using the Utility	31
Saving PINs for Next Time	32
The Parts of the PIN	33
Mode	33
Data Bits and Stop Bits	34
Baud Rate	34
Parity	35
Video Echo	35
Line Feed	36
Line Width	36
Write It Down	37
Figuring Out Your Own PIN	37
Setting the Serial Ports	39
Troubleshooting	43
Troubleshooting Tips	43
Troubleshooting Techniques	45
Editing the Device List	46
Glossary	G-1
Index	I-1
Tell Apple Card	

## Chapter 1

## Introduction



System is short for computer system, which refers to your computer and all its peripheral devices.

A file is a collection of information stored on a disk. If you're unfamiliar with this term or others in this book, refer to the interactive owner's guide.

This book explains how to use the *System Utilities* disk that came with your Apple IIc. You should read the first part of this book, the *Apple Presents the Apple IIc: An Interactive Owner's Guide* before you read this part.

*Utilities* is a word you probably associate with water, gas, and electric services. Well, just as home utilities keep your home operating efficiently, system utilities keep your computer operating efficiently.

*System Utilities* is a set of programs that give you control over the information you save on disks. (Which is pretty vital, when you consider all the vital information people entrust to disks: term papers, tax records, novels, financial models, programs.)

One of the most important things the utilities disk does for you is prepare, or format, your data disks. When you format a disk, the utility divides the magnetic surface of the disk into sections where information can be stored in files. Formatting is an important utility because you can't save anything on a disk until it has been prepared. Other utilities let you copy disks and individual files, check which files are on a disk, and erase files from disks so you can reuse the disk space.

Mastering these utilities is a giant step toward computer confidence. You won't have to worry about losing valuable information because you'll have backup copies of all your important disks. And you won't have to keep a handwritten record of what's on a disk because you'll know how to check its contents.

While the utilities disk is an invaluable part of your software library, it is not a substitute for application programs. You can't use it to write letters or prepare budgets. But you must use it to format disks that receive your letters and budgets, and once you have those letters safely stowed in files on disks, you can use the utilities disk to copy them, delete them, rename them, and otherwise organize them.

**Some Applications Include Utilities:** Some application programs have formatting and other utilities built in. When this is the case, go ahead and use the utilities on your application disk.

**Configuring the Serial Ports:** Another important part of the utilities disk lets you adapt the ports on the back of the Apple IIc for printers, plotters, or modems that don't work automatically with the Apple IIc. How to do this is explained in Chapter 4.



**Experienced Users:** The utilities disk works on Pascal, DOS 3.3, and ProDOS disks. It incorporates utilities and conversion functions from the DOS 3.3 *System Master* disk and most of the Pascal Filer and ProDOS utility functions.

---

## Using the Utilities Disk

The best way to learn how to use *System Utilities* is by experience. In the next few pages, you'll get a step-by-step, guided tour through one of the most valuable utilities—Duplicate a Disk. This utility allows you to copy important disks in your software library so you'll have a backup in case something happens to the original.

These are among the only step by step instructions in this guide. The reason is simple—you won't need written instructions to use the *System Utilities* disk. Everything you need to know or do is spelled out on the screen. Just choose the utility you want and follow the instructions. If those instructions aren't enough, read the general instructions in Chapter 2.

---

## Hands-On Introduction to Utilities

Don't just read about duplicating a disk, do it! Follow these instructions and make a backup copy of *System Utilities*.

Before you can make a copy of the utilities disk, you need a blank disk. If you don't have any blank disks, go out and get a box at your local computer store. The Apple IIc uses 5 1/4-inch, single-sided, single-density, flexible (floppy) disks.

For more on flexible disks, review the interactive owner's guide.

## **Starting Up**

First start up *System Utilities*.

1. Put the disk labeled *System Utilities* in the built-in disk drive.
2. Turn on your monitor.
3. Turn on your computer.

In a moment, you see the System Utilities Main Menu (Figure 1-1).

Figure 1-1. System Utilities *Main Menu*

Menu Name	<b>System Utilities</b> Copyright Apple Computer, Inc., 1984	Main Menu
	<hr/>	
	Work on Individual Files	
Highlighted Option	1. <COPY FILES>	
	2. Delete Files	
	3. Rename Files	
Numbered Option	4. Lock/Unlock Files	
	Work on Entire Disks	
	5. Duplicate a Disk	
	6. Format a Disk	
	7. Identify and Catalog a Disk	
	8. Advanced Operations	
	9. Exit System Utilities	
Your Instructions	Type a number or press ↓ or ↑ to select an option. Then press RETURN. _	
How to Get Help	For Help: Press ⌘-? or ⌥-?	

Using 80 Columns? If you are using an 80-column display, your screen will look slightly different.



## **Duplicate a Disk**

You're going to be duplicating a disk, which is the fifth option on the Main Menu, so you want to highlight that option.

You can also choose from a menu by typing the option's number and pressing **RETURN**. In this case, you would press **5** and then **RETURN**.

1. Press **↓** four times.

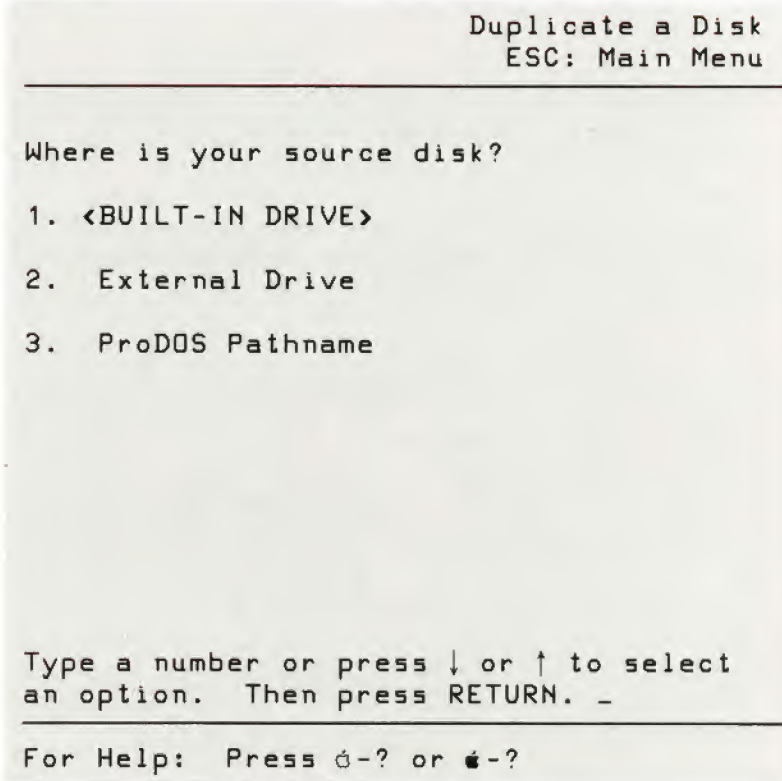
**Duplicate a Disk** is highlighted (the option is changed to uppercase and enclosed in angled brackets).

2. Press **RETURN**.

This accepts the highlighted option.

Your screen looks like Figure 1-2.

Figure 1-2. Source Disk Display



The source disk is the original—the disk you're copying from.

The Source Disk display invites you to supply information about the location of the disk you want to copy from (the source disk).

You want to make a copy of the *System Utilities* disk, which is in the built-in disk drive.

3. Press **(RETURN)**.

The option you want is highlighted, so you just have to accept it.

The destination disk is the new disk—the disk you're copying to.

Now you're asked to supply information about the location of the disk you want to copy to (the destination disk).

How you answer this question, and how you proceed, depends on whether or not you have an external disk drive. If you have an external disk drive, read the next section. If you don't have an external disk drive, skip the next section and read the section "Built-in Disk Drive Only."

### **Built-in Disk Drive and External Disk Drive**

Because you have two disk drives, you can use the built-in disk drive for your source disk and the external disk drive for your destination disk.

1. Press **(↓)** once.

**External Drive** is highlighted.

2. Press **(RETURN)**.

This accepts the highlighted option.

You see a message telling you where to put your source and destination disks.

Your source disk, *System Utilities*, is already in the built-in disk drive, so all you have to do is put your destination disk in the external disk drive and tell the computer you're ready to start copying.

3. Put a blank disk  
in the external  
disk drive.

4. Press **(RETURN)**.

You see a message telling you the source disk's operating system, and then you see a message requesting a name for your copy and a default answer:

A default is what the program thinks you will want.



Volume is another word for disk.

Enter Name of New Volume: /UTILITIES

UTILITIES is the name of the *System Utilities* disk. That name will be fine for the destination disk, so accept it.

5. Press **(RETURN)**. UTILITIES is used to name your destination disk.

A short while after that, you see this message: **Formatting...** (Disks have to be formatted before information can be recorded on them for the first time.) Then you see: **Done!**

After that, you see this message: **Duplicating...** Then you see: **Done!** That's all there is to it.

Skip the next section for single disk drive users and proceed to the section "Finishing Up."

### **Built-in Disk Drive Only**

You're going to alternate between putting your source disk and your destination disk in the built-in drive until the duplication is complete. But first you need to supply information about the location of your destination disk.

1. Press **(RETURN)**. This indicates that you'll be putting your destination disk in the built-in disk drive.

First you see a message telling you to put the source disk in the built-in drive. Your source disk is *System Utilities*, which is already in the built-in disk drive.

2. Press **(RETURN)**.

Then you see a message telling you to put your destination disk in the built-in disk drive.

3. Replace *System Utilities* with a blank disk and press **(RETURN)**.

Pressing **(RETURN)** lets the computer know you are ready to continue.

A default is what the program thinks you will want.

Volume is another word for disk.

You see a message telling you the source disk's operating system, and then you see a message requesting a name for your copy and a default answer:

**Enter Name of New Volume: /UTILITIES**

**UTILITIES** is the name of the *System Utilities* disk. That name will be fine for the destination disk, so accept it.

4. Press **(RETURN)**.

**UTILITIES** is used to name your destination disk.

After a few seconds, you see this message: **Formatting...** (Disks have to be formatted before information can be recorded on them for the first time.) Then you see: **Done!**

After that, watch for messages on the screen telling you when to swap *System Utilities* (the source disk) for your blank disk (the destination disk). Be patient—the copy procedure involves quite a few swaps. When it's all over, you see this message: **Disk Copy Complete.**

## Finishing Up

Take your new backup copy of *System Utilities* out of the disk drive and label it using a felt-tip pen (using a ball-point pen or a pencil can damage the disk).

Put the original *System Utilities* disk in a safe place and use your backup copy from now on.

**Copying Disks:** You can use Duplicate a Disk to copy all the disks that come with the interactive guide, but don't be surprised if you can't duplicate every application program you buy. Many manufacturers copy protect their disks to protect themselves from software pirates who illegally duplicate and distribute their programs.

Return to the Main Menu by pressing (ESC).

---

## Now What?

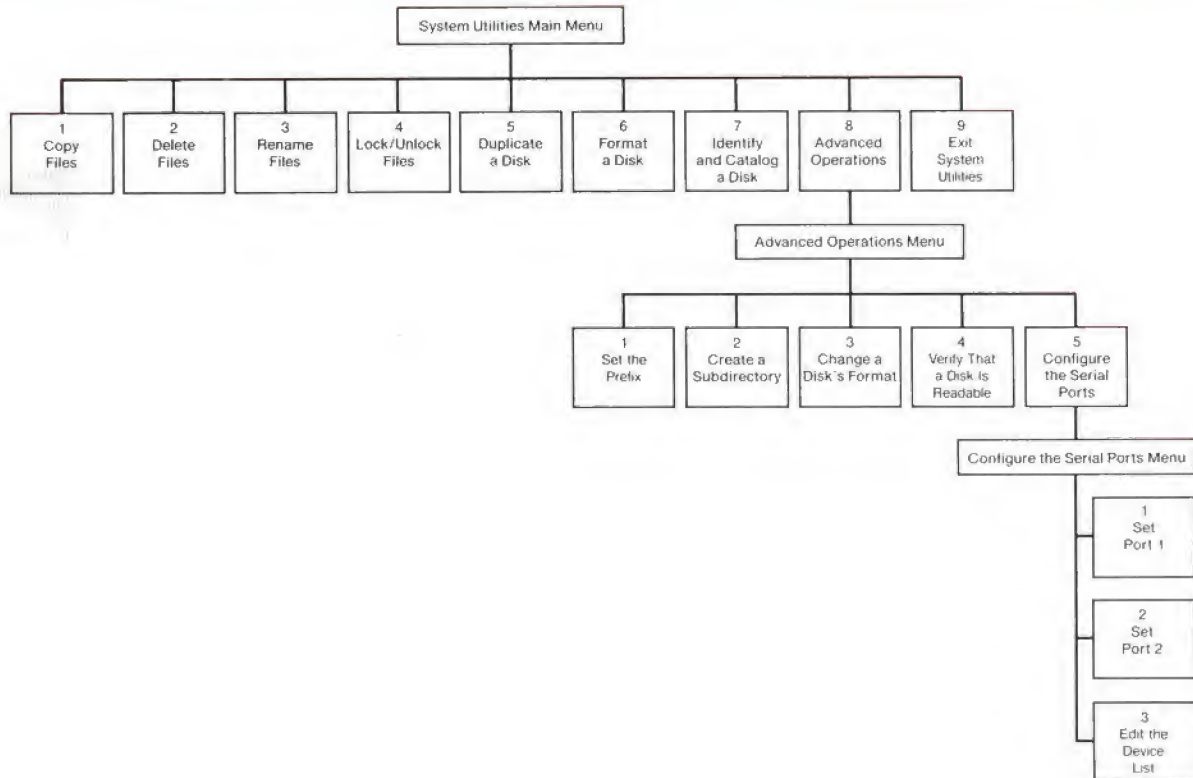
Now that you've had some hands-on experience with Duplicate a Disk, you're probably eager to see what else *System Utilities* can do.

- Chapter 2 offers some general instructions for using the disk.
- Chapter 3 summarizes the utilities available on the disk.
- Chapter 4 explains how to adapt the ports on the back of the Apple IIc for printers, plotters, or modems that don't work automatically with the Apple IIc.



For those who like the big picture, here's a roadmap of *System Utilities*.

Figure 1-3. Utilities Roadmap



## Chapter 2

## General Instructions







Prompts are messages on the screen.

As you discovered when you used *System Utilities* to make a backup copy, using the utilities is fairly straightforward. Messages on the screen tell you what your options are and ask you for information the program needs. Rely on these prompts and you should have no trouble using any of the utilities on this disk.

## Getting Help

---

Press - or - for helpful hints.



If you hit a snag, press - and you'll get a screen full of on-line coaching. (See Figure 2-1.) If the help screens don't answer your questions, review the general instructions in this chapter and in Chapter 3.



Figure 2-1. System Utilities Main Menu

```
System Utilities                                Main Menu
-----
| Delete Files permanently removes          |
| individual files from your disk          |
| without affecting other files on         |
| the disk. If you want to erase          |
| everything on a disk, it's quicker       |
| to use Format a Disk.                    |
|                                          |
| Press RETURN to continue.                |
-----
Work on Entire Disks

5. Duplicate a Disk
6. Format a Disk
7. Identify and Catalog a Disk
8. Advanced Operations

9. Exit System Utilities

Type a number or press ↓ or ↑ to select
an option. Then press RETURN. _

For Help: Press ⌘-? or ⌘-?
```

The help message you get depends on where you are in the *System Utilities* disk. If **DELETE A FILE** is highlighted on the Main Menu, you'll get the message in Figure 2-1. As you use the different utilities, try pressing (⌘)-(?) to see what message you get. You may find that the help messages let you get by without using this book at all!

## Selecting From a Menu

---

There are two ways to select items from a *System Utilities* menu:

- Type the number of your selection and press **RETURN**.
- Press **↑** or **↓** to highlight your selection and then press **RETURN**.

## Selecting the Disk Drive

---

Once you pick the utility you want to use, you're usually asked to select the location of the disk you'll be working on. If you're going to put the disk in the built-in disk drive, select option 1, Built-in Disk Drive. If you're going to put the disk in the external disk drive, select option 2, External Disk Drive. It's as simple as that.

With some utilities, like Duplicate a Disk and Copy a File, you are asked for the location of two disks: the disk you're copying from (the source disk) and the disk you're copying to (the destination disk). If you have an external disk drive, you can put your source disk in one drive and your destination disk in the other. If you don't, select the built-in disk drive as the location for both the source and destination disks and watch for messages on the screen that tell you when to swap the source disk for the destination disk.

The source disk is the disk you're copying from.

The destination disk is the disk you're copying to.

A **pathname** is the full name of a file. It begins with the name of the disk (or volume), then lists any subdirectories (if you use subdirectories), and ends with the filename. Each name in the pathname is separated with a slash.

**Selecting by Pathname:** If the disk you're working on is ProDOS-based, you have the option of identifying files by pathname (the third option) instead of by disk drive. If you use subdirectories, you must use this option.

## Selecting Files

---

What happens after you select a utility and disk drives depends on whether you're working on the disk as a whole or on individual files. If you're working on the disk as a whole, your job is practically finished. Watch the screen for any remaining instructions. If you're working on files, you are asked whether you want to select some of the files on the disk or all of the files.

If you want to copy, delete, or lock all the files on the disk, press **(A)** (for *All*) and then **(RETURN)**. Then watch for messages on the screen that tell you what to do.

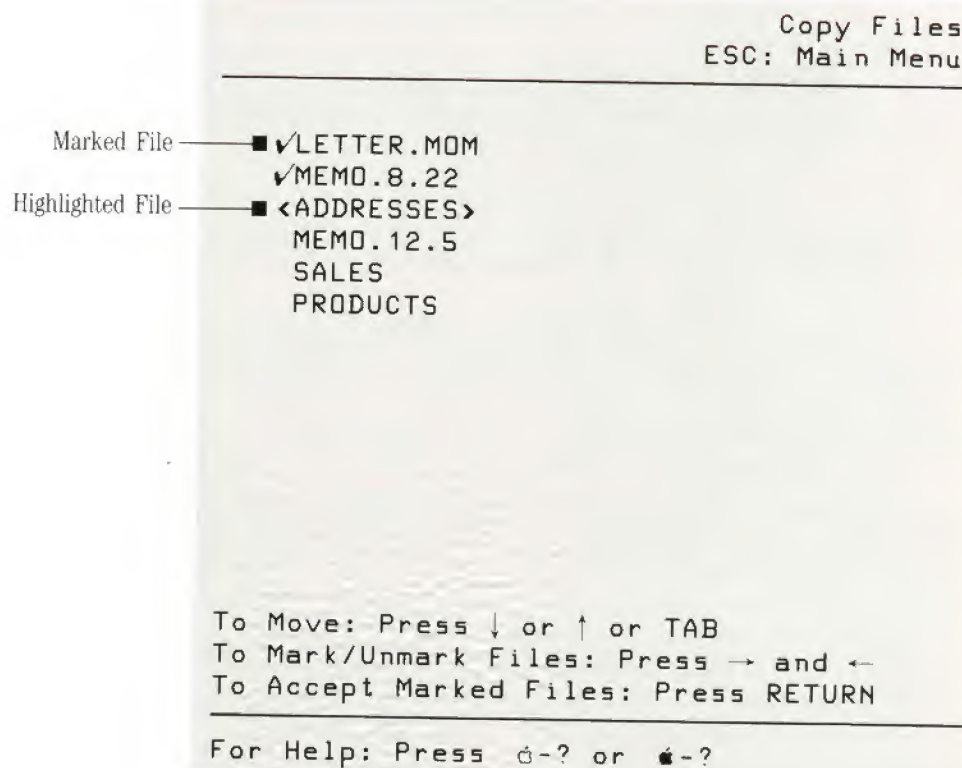
If you want to select only some of the files on the disk for copying, renaming, or whatever, press **(RETURN)** to accept the default. The next screen you see is a list of all the files on the disk.

Press **(↓)** or **(↑)** to highlight a file you want to work on. Press **(→)** to mark the file. A check will appear next to the file. (If you change your mind, you can unmark the file by moving the highlight to it and pressing **(←)**.)

If there is more than one row of files on the screen, press **(TAB)** to move back and forth between rows.



Figure 2-2. Marking Files



When you've marked all the files, press **RETURN**. Then watch for screen messages that tell you what your Apple IIc is doing and what you should do.

## Naming Disks and Files

---

Some utilities will ask you to give your disk or file a name. You can be as creative as you want, within these guidelines:

- Names must begin with a letter.
- Names must be made up of only letters, numbers, and periods.
- Names cannot have any spaces or punctuation other than periods.
- Names cannot have more than 15 characters (except Pascal volume names, which can have only seven characters).

By the Way: Rules for naming DOS 3.3 and Pascal files are different from the ones just outlined, but if you follow these general rules, you won't have to worry about which operating system you're working with.

### Defaults

---

When the program asks you to name a disk or a file, it usually provides a **default** name for you. You can accept the default by pressing **(RETURN)**, you can override the default by typing in a new name, or you can edit the default.

To enter an entirely new name, just start typing the name. (The default disappears.) Press **(RETURN)** when you're finished typing the name. To edit the default, press **(→)** and **(←)** to move the cursor to the spot where you want to insert characters and type them in. Press **(DELETE)** to erase characters to the left of cursor. Press **(RETURN)** when you are finished editing the name.

## Making Your Escape

---

Wherever you are in *System Utilities*, you can press **(ESC)** to return to the previous menu.

Pressing **(ESC)** while you are in the middle of a file utility lets you stop what you are doing at the first opportunity. This comes in handy if you change your mind after you start using a utility.

Volume is another word for disk.

It's called a default because it will be used by default if you don't provide an alternative.

## Quitting

---

When you are finished using *System Utilities*, select the last option on the Main Menu: Exit System Utilities. You are asked if you are sure you want to leave *System Utilities*. If you are sure, answer *Yes* by pressing **(RETURN)**, and you'll exit to Applesoft BASIC.

If you left *System Utilities* by mistake, select *No*, and you'll find yourself back at the Main Menu.

If you want to start up an application program, put the program disk in the built-in drive and hold down **(⌘)** and **(CONTROL)** while you press **(RESET)**.



---

## Chapter 3

---

## The Utilities



This chapter summarizes the utilities on the *System Utilities* disk.

## Copy Files

---

Copy Files lets you copy a file or files from one disk to another. It comes in handy when you want to share data or programs with friends or business associates. (If you want to copy all the files on a disk, you're better off using the Duplicate a Disk utility.)

Make sure your destination disk has the same format as your source disk (ProDOS, DOS 3.3, or Pascal), or the files will be converted to the destination disk's format as they're copied.



## Delete Files

---

Delete Files lets you permanently erase files that have outlived their usefulness so you can reuse the disk space. (If you want to delete everything on a disk, use the Format a Disk utility.)

## Rename Files

---

You don't need written instructions for using these utilities. Just choose the utility you want from the *System Utilities* Main Menu and follow the instructions that appear on the screen. If you get stuck, press - for more detailed instructions.

Rename Files lets you rename a file without changing its contents.

**Changing the Name of a Disk:** If you want to rename a disk, make a copy of the disk by using Duplicate a Disk and give the new copy the new name.

## Lock/Unlock Files

---

Lock/Unlock Files lets you lock files so you don't delete them, rename them, or change their contents by mistake. If you're sure you want to delete or alter a locked file, you can also use this utility to unlock it.

## Duplicate a Disk

---

As you discovered in Chapter 1, Duplicate a Disk lets you make an exact copy of a disk. If you believe in insurance for your home and car, you'll want to take out some disk insurance with this invaluable utility.

If any of the disk-related terms, such as write-enable notch and write-protect tab, are new to you, see the interactive owner's guide.

**Don't Take Chances:** When you're making copies of important disks, it's a good idea to cover the notch on your source disk with one of the sticky write-protect tabs that come with blank disks—just in case you get your source and destination disks confused during the copy process. (Some disks don't have write-enable notches. You couldn't change the contents of the disk even if you wanted to, so with these disks you don't have to worry about using a write-protect tab.)

## Format a Disk

---

Formatting a disk means dividing the magnetic surface of the disk into sections where information can be stored. You can't store information on a blank disk until it has been formatted.

An operating system is a program that controls things: for instance, the way information is loaded into memory, the way the computer works with information, and the way information is stored on a disk. There are three operating systems available for the Apple IIc: ProDOS, Pascal, and DOS 3.3.

So why don't blank disks come preformatted? Disks don't come preformatted because different operating systems store information on disks in different ways. Your word processing data disk has to be formatted for the operating system your word processing program uses. If your home finance program has a Pascal operating system and your word processing program has a ProDOS operating system, you'll need two different data disks.

If you know which operating system your program requires (it's often printed on the label or mentioned in the manual), you can save time by supplying that information when the formatting utility asks for it. (See Figure 3-1). If you don't have a clue, the utilities disk can figure out the operating system and format the disk accordingly. Here's how.



## **Formatting When You Don't Know the Operating System**

1. Select the Format a Disk option from the Main Menu.
2. Select the disk drive you're going to use (built-in or external).
3. Type 4 and press **(RETURN)**. The program will ask you to put your application program disk in the built-in disk drive or the external disk drive (depending on which drive you specified in step 2).

### **Important!**

If you're using the built-in disk drive, be sure to remove your *System Utilities* disk before inserting the program disk.

### **Important!**

It's a good idea to cover the write-enable notch on your application program disk (if it has a notch) with a write-protect tab so you won't format it by mistake if you forget to take it out of the disk drive.

4. Put your application program disk in the appropriate drive and press **(RETURN)**. In a few seconds you'll see a display telling you the disk's operating system and the volume name of your application program disk.

5. Type a name for the disk you're about to format. (The name you type will replace the name of your application program disk that now appears on your screen.)

6. Press **(RETURN)**. The program will ask you to put the disk you want to format in the built-in or external disk drive.

### **Important!**

If you haven't done so already, take your application program out of the disk drive.

7. Put the disk you want to format in the appropriate drive and press **(RETURN)**.


If the disk is blank, it will be formatted. If the disk has something on it, you'll be asked **okay to destroy the disk?** If you don't mind losing what's on that disk, type **Y** for yes and it will be formatted. If you put the wrong disk in the drive by mistake, type **N** and no harm is done. Although you must format blank disks before you can use them, disks don't have to be blank to be formatted. It is important, however, that the information on the used disk be expendable. When you format a disk, *everything* that was stored on the disk is erased.

The destination disk is the disk you copy to.

The only time you don't have to format blank disks before you use them is when you use the Duplicate a Disk utility. Duplicate a Disk formats the destination disk before copying information onto it.

## Identify and Catalog a Disk

---

You don't need written instructions for using these utilities. Just choose the utility you want from the *System Utilities* Main Menu and follow the instructions that appear on the screen. If you get stuck, press  (?) for more detailed instructions.

Identify and Catalog a Disk displays a list of what's on a disk. It's a valuable tool because you can't open a disk, as you can a book, to see what's inside, and it's a nuisance to keep a written record of every file you save on a disk.

In addition to telling you which files are on a disk, Identify and Catalog a Disk tells you the disk's operating system, the disk's name (or number in the case of DOS 3.2 or DOS 3.3 disks), each file's type, each file's size, the number of files on the disk, the number of blocks or sectors taken up by the files, and how many blocks or sectors are available on the disk.

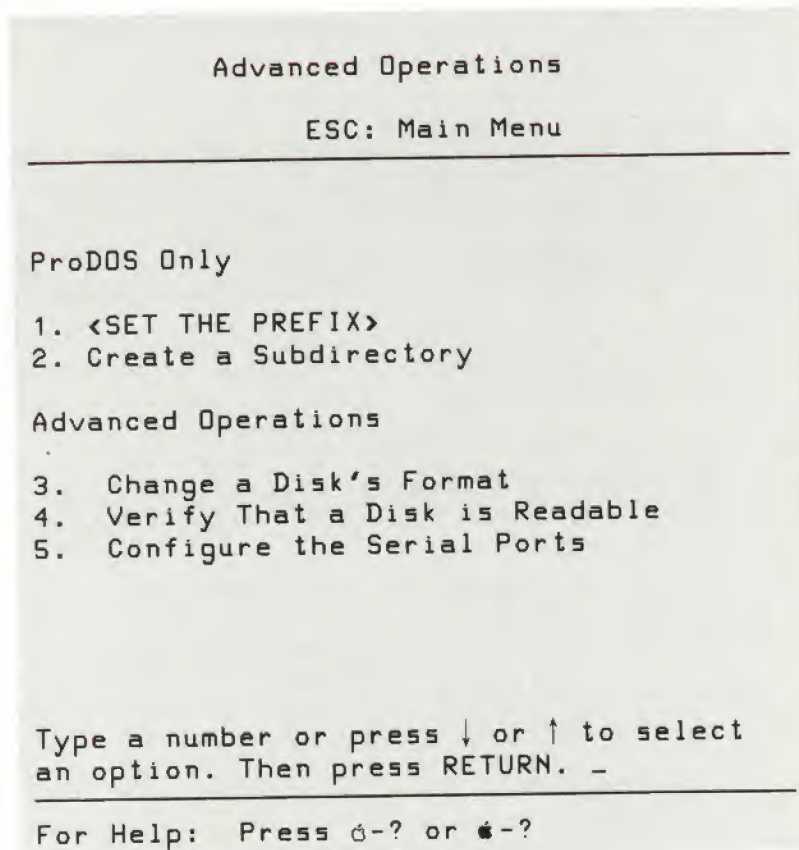
## Advanced Operations

---

In addition to the utilities listed on the Main Menu, there are five advanced utilities: Configure the Serial Ports, Verify That a Disk Is Readable, Change a Disk's Format, Create a Subdirectory, and Set the Prefix. (Create a Subdirectory and Set the Prefix apply only to ProDOS disks.)

To get to the Advanced Operations Menu, select Advanced Operations from the System Utilities Main Menu. You'll see the display shown in Figure 3-1.

Figure 3-1. Advanced Operations Menu





## Set the Prefix (ProDOS Only)

---

A prefix is the first part of a pathname. A pathname is the full name of a file. It begins with the name of the disk (or volume), then lists any subdirectories (if you use subdirectories), and ends with the filename. Each name in the pathname is separated with a slash. For example: /USA/UTAH/SALT.LAKE

Set the Prefix lets you store the first part of a pathname (the volume name and any subdirectory names) in the memory of the computer so you can access files in that directory or subdirectory simply by typing the rest of the pathname (usually just the filename). Once you set the prefix, it stays set until you change it or turn off the computer. To override a prefix, type a complete pathname beginning with a slash.

## Create a Subdirectory (ProDOS Only)

---

When a disk is first formatted, two things happen: the disk's recording surface is divided into sections where information can be stored, and the disk gets a directory (or catalog). Every file you save on the disk is listed in that directory.

If your disk is ProDOS formatted, you can set up subdirectories within the disk directory and group related files. Before you can put files in a subdirectory, you must create it, using this utility.

Subdirectories are like drawers in a file cabinet. Imagine a disk named MONEY with two subdirectories—one called INCOME, the other called EXPENSES. To access a file called FREELANCE in the INCOME subdirectory on this disk, you'd supply the file's pathname: the name of the disk, then the name of the subdirectory, and, finally, the name of the file (each name separated with a slash). Here's how it would look:

/MONEY/INCOME/FREELANCE

If you organize your files into subdirectories, you must supply the ProDOS pathname to get to your files—instead of the location of the disk (built-in or external disk drive).

If you're going to be using files in the same subdirectory for a while, you can save typing time by setting a prefix. See "Set the Prefix (ProDOS Only)."

## Verify That a Disk Is Readable

---

Verify That a Disk Is Readable checks to see if a disk is OK. Disks are sturdy enough to withstand hundreds of trips in and out of the disk drive, but they become temperamental if you leave them on the dashboard all afternoon in the hot sun or otherwise abuse them. Occasionally, disks are damaged during manufacture.

Use Verify That a Disk Is Readable to check newly formatted disks before entrusting valuable data to them. You can also use this utility to check disks you suspect have been damaged. If you discover that a disk is bad, use Copy Files to salvage any files you can to another disk. Then reformat the disk and check it again using this utility. If it's still bad, throw it away.

## Change a Disk's Format

---


Change a Disk's Format lets you convert disks from DOS 3.2 to DOS 3.3, DOS 3.3 to ProDOS, and ProDOS to DOS 3.3.

### Warning

This utility makes it possible for a program to be stored and retrieved by an operating system other than the one under which the program was originally written. To make the program run under the new operating system, you sometimes have to make changes to the code.

## Configure the Serial Ports

---

You don't need written instructions for using these utilities. Just choose the utility you want from the *Advanced Utilities* Menu and follow the instructions that appear on the screen. If you get stuck, press  for more detailed instructions.

Configure the Serial Ports lets you set up the printer and modem ports on your Apple IIc to communicate with devices that don't work automatically with the Apple IIc. This utility is explained in detail in Chapter 4.

## Chapter 4

## Configure the Serial Ports





Serial devices send and receive information one bit at a time while parallel devices send and receive information eight bits (one byte) at a time.

**Important!**

Printing a copy of a catalog is one of your options when you use the Identify and Catalog a Disk utility.

Most of the utilities on *System Utilities* are related to files or disks. The exception is Configure the Serial Ports, one of the options on the Advanced Operations Menu.

Configure the Serial Ports lets you adapt the printer or modem ports on your Apple IIc to communicate with devices that don't work automatically with your computer.

You will need to use this utility only if your peripheral device doesn't work automatically with the Apple IIc.

When you turn on the power, the Apple IIc serial ports are automatically set up, or configured, to communicate with an Apple Scribe or an Apple Imagewriter printer in the printer port (port 1) and an Apple 300 Baud Modem in the modem port (port 2). If you have these devices, or a device that uses the same configuration (speaks the same language), just plug in your printer or modem, and you're ready to go.

The easiest way to find out if your printer will work automatically with the Apple IIc is to plug it into the printer port and try printing a catalog of *System Utilities*. If it works, your device has a standard configuration. If you get a page full of garbage, you need to configure the port for your device.

**Try Your Application Programs:** Some application programs will override the configuration, so try printing something after starting up your application program. If it works, you don't need to configure your printer port.

To find out if your modem will work with the Apple IIc, plug it into the modem port and try sending or receiving a message. If it works, you don't need to configure your modem port. If it doesn't, you'll need to configure one of the ports for your modem.

The nice thing about the serial ports is that you're not limited to Apple and similarly configured devices. The serial ports can be configured to accommodate a wide variety of peripheral devices. Configuring a port tells the port how to communicate with a particular peripheral device.

## Using the Utility

---

You don't have to be a programmer to configure a serial port on the Apple IIc. All you have to do is answer a set of multiple choice questions about your peripheral device, and the configuration utility will tell the port how to communicate with your device.

You should be able to find the answers to all of the multiple choice questions in the manual that came with your device. If you can't find the answer, accept the default. (The default answers are the most common settings.) If that doesn't work, you'll find a set of troubleshooting tips later in this chapter, and you can use trial and error to find the right configuration for your device.

Once you answer the multiple choice questions about your device, the configuration utility

A product identification number (PIN) describes a device's characteristics and is used to configure the serial ports of the Apple IIc.

- Displays a product identification number (PIN) for your device
- Configures port 1 or port 2 for your device
- Gives you the chance to save your device's PIN on your utilities disk as the new default configuration for port 1 or port 2.


**More Than Two Serial Devices:** If you have several devices that will share ports 1 and 2, or if you have different configurations for the same device—maybe you use the same modem to communicate with two information services with different configuration requirements—the configuration utility lets you list all of your devices and their PINs. That way, when you swap devices, all you have to do is select the device from the list and let the utility set up the port for you. (You'll learn how in "Editing the Device List.") If you have one or two devices, you don't need to list them; you can just make their PINs the defaults for ports 1 and 2.

---

## **Saving PINs for Next Time**

Random-access memory is explained in the interactive owner's guide.

Once you've figured out a device's PIN, you never have to do it again. That PIN can be saved on your utilities disk. But when you turn off the computer's power, your new serial port configuration is erased from the computer's memory (because PINs are stored in random-access memory). So, you need to configure the serial ports for your devices every time you turn on the power. Fortunately, it's very simple.

All you have to do is start up your copy of the utilities disk. Once you see the Main Menu, your customized serial port configuration is set. Then replace your utilities disk with the application program's disk and restart the computer by holding down  while you press **CONTROL-RESET**.

**Some Application Programs Configure Ports for You:** Some application programs, designed for the Apple IIc, will ask for PINs and configure the serial ports for you so you won't have to start up your utilities disk before starting up the application. If you don't know the PIN for your device, use the configuration utility or Figure 4-1 to derive it.



**Switching Application Programs:** If you leave the computer's power on, you should be able to switch from one application program to another without reconfiguring the serial ports. However, some programs may inadvertently interfere with the PIN settings (by using the same part of memory). If you lose touch with your peripheral devices, start up your utilities disk (to reconfigure the ports), then start up your application program by pressing **␣-CONTROL-RESET**.

So much for background. The first step in configuring a serial port is determining your device's product identification number.

## The Parts of the PIN

---

Some printer and modem manuals provide the PIN for the device, allowing you to bypass the multiple choice questions.

Here's what goes into determining your device's PIN (product identification number). You might want to look up the information for your device (and write it down on the form at the end of this section) before using the configuration utility. That way, when the utility asks for your device's baud rate, data format, and so on, you'll have the answers at your fingertips. If you already know the PIN for your device, you can skip this section and go on to "Setting the Serial Ports."

### Mode

---

Mode is a general purpose computer term. In this case, it refers to the method of communicating with a peripheral device. If you're configuring the port for a printer or plotter, choose printer mode. If you're configuring the port for a modem, choose communications mode.

1. **Printer Mode**
2. **Communications Mode**

## **Data Bits and Stop Bits**

The computer sends and receives each character of information (or data) as a string of bits (zeros and ones). Characters can be represented with six, seven, or eight data bits. Stop bits indicate the end of a character. You can have one stop bit or two. There are six possibilities for the way the device receives or sends characters:

1. 6 Data Bits / 1 Stop Bit
2. 6 Data Bits / 2 Stop Bits
3. 7 Data Bits / 1 Stop Bit
4. 7 Data Bits / 2 Stop Bits
5. 8 Data Bits / 1 Stop Bit
6. 8 Data Bits / 2 Stop Bits

If you can't find this information in your manual (data bits and stop bits are usually listed under "data format" or on a specifications page), the most common data format for printers is eight data bits and two stop bits.

Choosing the data format for a modem depends on the information service you're using. Consult the manual provided by the information service to find out what data format to use. If you can't find any specifications for data format, use the most common format for modems: eight data bits and one stop bit. (If that doesn't work, try seven data bits and two stop bits.)

## **Baud Rate**

Computers send and receive information at a certain speed measured in bits per second, also known as the baud rate. There are seven possible speeds:

1. 110 Bits per Second
2. 300 Bits per Second
3. 1200 Bits per Second
4. 2400 Bits per Second
5. 4800 Bits per Second
6. 9600 Bits per Second
7. 19200 Bits per Second

You'll usually find this information on a specifications page in the manual that came with your printer or modem. The most common printer speed is 9600 baud. The most common modem baud rate is 300. The important thing is that your printer and computer, or your modem and the information service, are using the same baud rate.

### **Parity**

Some devices use a parity bit for error checking—to check to see if data got garbled during transmission. There are five possibilities:

1. No Parity
2. Even Parity
3. Odd Parity
4. Mark Parity
5. Space Parity

If you can't find parity bit information in your device's manual, choose option 1.

### **Video Echo**

How you set video echo for a modem depends on whether you're communicating with a computer set to full duplex or to half duplex. (Most information services use full duplex.) Full duplex will echo every character you transmit back to your video monitor. So you should choose option 1. (If you choose option 2, you'll get two of every character on your screen.)

A half duplex setting won't echo the characters you transmit, so if you want to see what you're sending out, you must echo the output, option 2.

It's best to set option 1 for printers because echoing output to the screen can limit the line width of what you're printing to the line width of the screen.

1. Do Not Echo Output on Screen
2. Echo Output on Screen

When in doubt, choose option 1.



## **Line Feed**

Some printers and some application programs automatically generate a line feed (go to the next line) after each carriage return; others don't.

When in doubt, generate a line feed, option 2, and try printing something. If it looks right, you're in business. If everything is double-spaced, make sure the automatic line feed switch on your printer is *off*. If you still get double-spacing, the extra line feed is coming from your application program and you should change to option 1.

LF stands for line feed. CR stands for carriage return.

1. Do Not Insert LF After CR
2. Insert LF After CR

## **Line Width**

Line width indicates the number of characters that your printer will print per line (before generating a carriage return). Set it to the greatest width your printer can handle. The most common setting is 80 characters. Many application programs let you set the width from within the program. If that's the case, or if you find the computer adding carriage returns where they don't belong, choose option 1 and the computer won't try to control line width.

Always choose option 1 for plotters.

1. Do Not Insert CR
2. Insert CR After 40 Characters
3. Insert CR After 72 Characters
4. Insert CR After 80 Characters
5. Insert CR After 132 Characters

### **Important!**

If you selected Communications Mode, the utility picks option 1 for you.

## Write It Down

---

Here's a summary of the defaults for each port. You might want to fill in your own settings for reference and comparison. Remember, if you can't find one of the settings in the manual supplied with your device or information service, go with the default.

### Port 1 Default

### Your Device

Printer Mode

\_\_\_\_\_

8 Data Bits / 2 Stop Bits

\_\_\_\_\_

9600 Bits per Second

\_\_\_\_\_

No Parity

\_\_\_\_\_

Do Not Echo Output on Screen

\_\_\_\_\_

Insert LF After CR

\_\_\_\_\_

Insert CR After 80 Characters

\_\_\_\_\_

### Port 2 Default

### Your Device

Communications Mode

\_\_\_\_\_

8 Data Bits / 1 Stop Bit

\_\_\_\_\_

300 Bits per Second

\_\_\_\_\_

No Parity

\_\_\_\_\_

Do Not Echo Output on Screen

\_\_\_\_\_

Insert LF After CR

\_\_\_\_\_

Do Not Insert CR

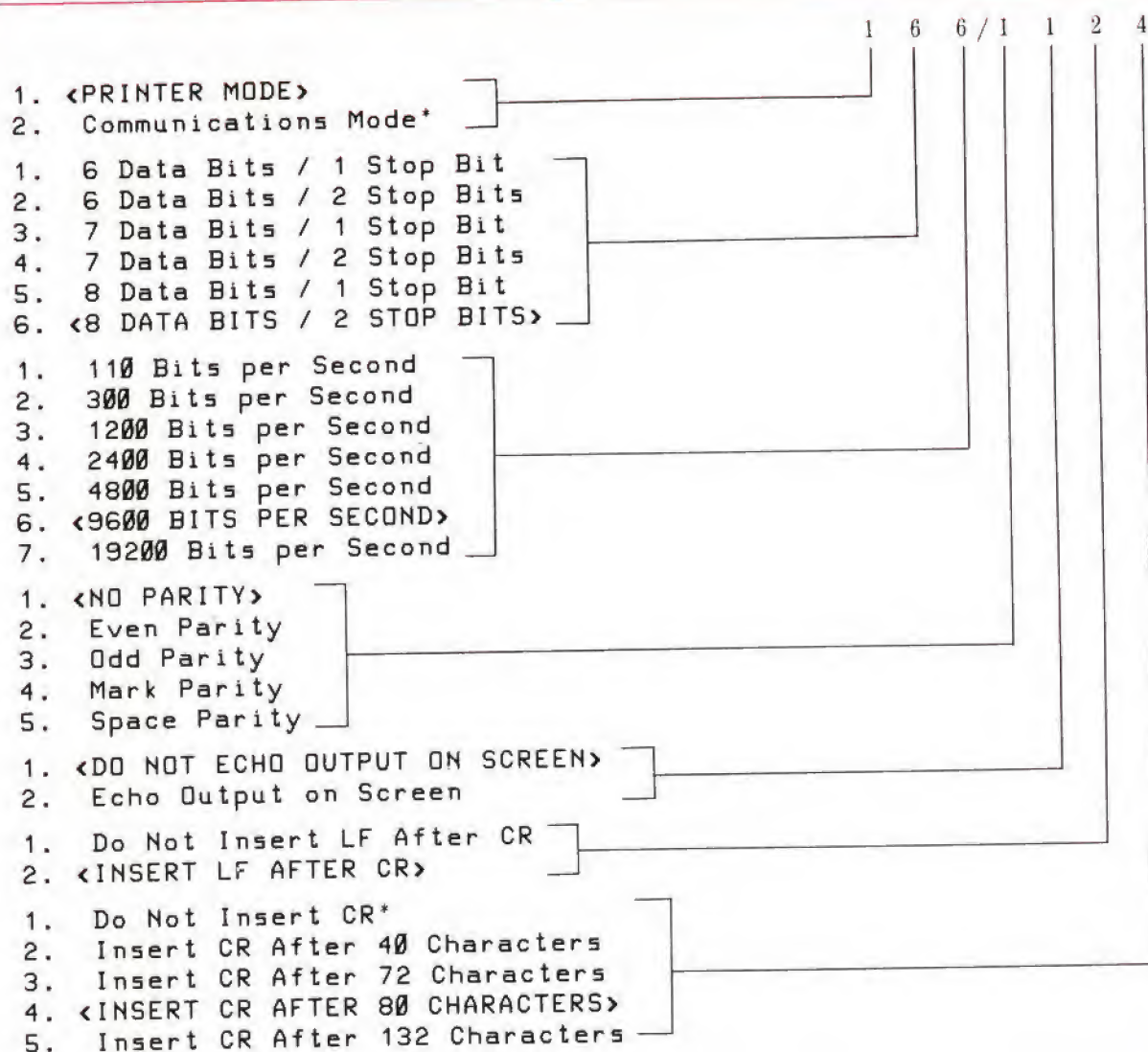
\_\_\_\_\_

## Figuring Out Your Own PIN

---

Once you know the baud rate and other information about your device, you can either let the program derive your PIN or you can figure it out yourself using Figure 4-1.

Figure 4-1. Determining a PIN. The number is made up of seven digits. Each digit corresponds to an option number.



\* If you select Communications Mode, digit 7 must be 1 (Do Not Insert CR).



## Setting the Serial Ports

---

Once you know which settings you need or have found out your device's PIN, you're ready to use the Configure the Serial Ports utility.

### Important!

Use Duplicate a Disk to make a copy of *System Utilities*. You'll find a step by step tutorial in Chapter 1.

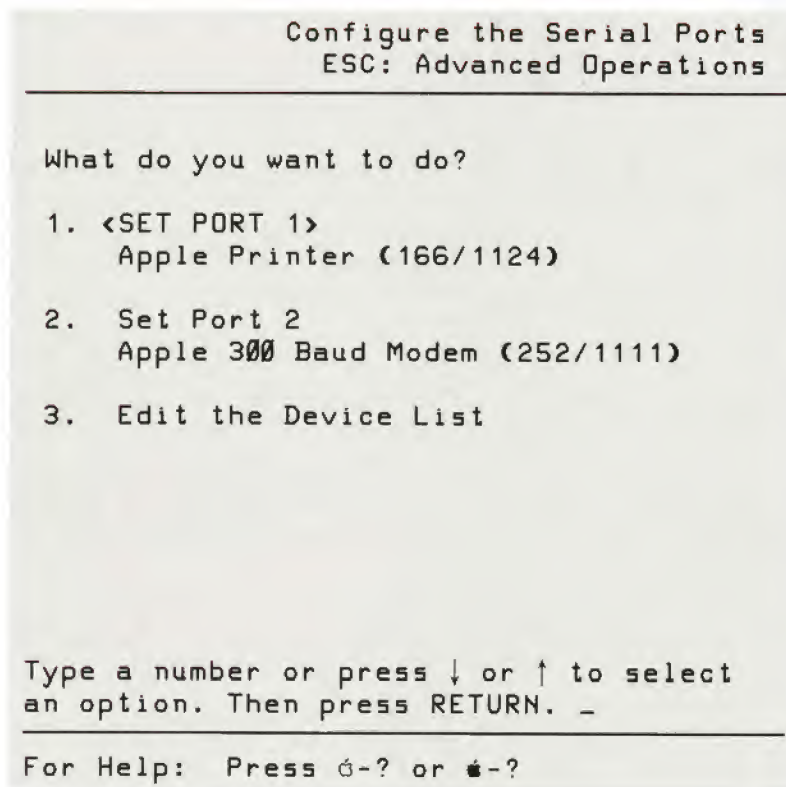
Before you go any further, make a copy of *System Utilities* (if you haven't already), and use the backup copy when you configure your serial ports. The configuration program writes information on the disk (if you save your configuration), and you can't alter the original *System Utilities*—it's write protected to prevent you from erasing or writing over valuable information by mistake. And because the utility writes on the disk, be sure your backup copy does not have a write-protect tab.

1. Start up your copy of the utilities disk.

**By the Way:** If you're already using your copy of the utilities disk, return to the Main Menu by pressing **(ESC)**.

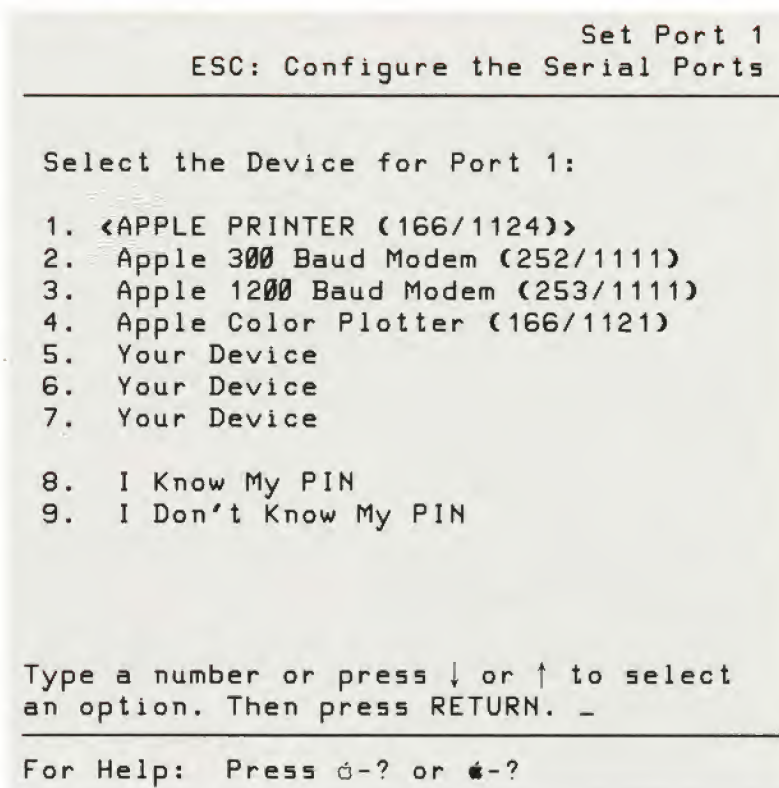
2. Choose Advanced Operations from the Main Menu.
3. Choose Configure the Serial Ports from the Advanced Operations Menu. You see a screen similar to Figure 4-2.

Figure 4-2. Configure the Serial Ports Menu. The current devices are listed with their PINs.



4. Choose the port you want to configure. You see your device list. It looks like Figure 4-3.

Figure 4-3. Typical Device List





5. If your device is listed, choose it.

If it's not listed, but you know the PIN, choose 8. You see a message asking you to type the PIN. Type the number and press **RETURN**. You are asked if the PIN is correct. If the PIN is correct, answer *Yes* by pressing **RETURN**. (If it's not, select *No* and press **RETURN**, and you can try again.)

If you don't know the PIN, choose 9. Supply the information that is requested about your device. (If you're unsure about any of the answers, accept the default.) When you supply all the information, you see a screen summarizing the information and displaying your PIN. If the information is correct, answer *Yes* by pressing **RETURN**. (If it's not, select *No* and press **RETURN**, and you'll have another chance at all the settings.)

6. Then you are asked if you want to save the configuration on your utilities disk. If you answer *Yes* by pressing **RETURN**, the information is saved on your disk as the default PIN for the port you are configuring. If you select *No*, the port is configured, but the PIN isn't saved on the disk for later use.

That's all there is to it. If you need to reconfigure the other port, do so the same way. When you've got both ports configured, start up the program you want to use by holding down **⌘** and **CONTROL** while you press **RESET**.

Try printing something or sending a message through your modem. If you have any problems, consult the troubleshooting section that follows.

## Troubleshooting

---

If you had to guess at any of the settings, don't be surprised if your first crack at configuring the serial ports didn't work. Here are some guidelines to help you decide which settings are wrong and how you should adjust them.

**Trial and Error:** Don't be afraid to experiment with different settings until you find one that works—you won't break the computer or your peripheral device. But do it systematically. The most common cause of garbage is the wrong baud rate. Other problems have distinctive symptoms that will suggest what the problem is and what you can do about it.

### Troubleshooting Tips

---

Here are some suggestions for getting your ports configured correctly. Try the suggested solutions one at a time until you find one that works.

Symptom	Solution
Unintentional double or triple spacing.	Turn the automatic line feed switch on the printer (or change the application program's line feed setting) to <i>off</i> . Change the PIN so a line feed after a carriage return is not inserted.
Lines are printing on top of each other.	Both of the above. Turn the automatic line feed switch on the printer to <i>on</i> . Change the PIN so a line feed after a carriage return is inserted.
Characters are lost during data transfer.	Change to a lower baud rate, if possible, on both the sending and receiving ends.

## Symptom

General garbage.

## Solution

Check the baud rate you are using against the device's manual—if it's wrong, change the PIN or change the switch on your printer or modem.

Check the data format (data bits/stop bits/parity) against the device's manual—if it's wrong, change the PIN or change the switch on your printer or modem.

Unintentional carriage returns.

Change the line width so that a carriage return is not generated. This lets the application program insert its own carriage returns.

Text runs off the page.

Set the line width to a lower number.

Two of every character appear on the screen while sending messages through a modem.

Change the PIN so output is not echoed on the screen.

Information sent through a modem doesn't appear on the screen.

Change the PIN so output is echoed on the screen.

Output to a printer is the same width as the screen when you wanted it wider.

Change the PIN so output is not echoed on the screen.



## Troubleshooting Techniques

Some symptoms give you unmistakable clues to what the problem is. For example, if you're getting too many line feeds after a carriage return, you know that you have to adjust the line feed on your printer—through your application program or by changing the PIN. Problems with line width and echo are equally easy to detect and solve.

Problems with baud rate and with data format (data bits/stop bits/parity) are a little tougher to diagnose. They all produce a string of unrelated characters (**garbage** in the computer vernacular).

If you get garbage on your printer or display, start by checking the baud rate in the manual. (If you can't find the baud rate for your printer or plotter, try 9600, then 1200. If you can't find the baud rate for your modem, try 300, then 1200.)

If baud rate isn't the problem, experiment with different data formats, starting at the top of Table 4-1 (for printers) and Table 4-2 (for modems) and working your way down. Use the boxes on the right to check off the combinations you've tried.

**One Thing at a Time:** Whatever you do, don't change all the settings at once. Alter one setting at a time, then make a test before going on to the next variation. And keep track of what you've tried so you don't keep going over the same ground.

Table 4-1. Common Printer Settings

Data Bits	Stop Bits	Parity	
8	2	off	<input type="checkbox"/>
7	2	off	<input type="checkbox"/>
8	2	odd	<input type="checkbox"/>
8	2	even	<input type="checkbox"/>
7	2	odd	<input type="checkbox"/>
7	2	even	<input type="checkbox"/>

Table 4-2. Common Modem Settings

Data Bits	Stop Bits	Parity	
8	1	off	<input type="checkbox"/>
7	2	off	<input type="checkbox"/>
7	1	off	<input type="checkbox"/>
8	1	odd	<input type="checkbox"/>
8	1	even	<input type="checkbox"/>
7	2	odd	<input type="checkbox"/>
7	1	even	<input type="checkbox"/>

**Important!**

Because of timing peculiarities in the baud rate generator of the Apple IIc, some modems may require a different data format than the one listed in the modem or information service manual. Experiment with different settings until you find the one that works.

## Editing the Device List

If you have several devices that share the serial ports, you should add all of your devices and their PINs to the device list so that the ports are easy to reconfigure. The device list includes several popular Apple devices and has place holders for other devices. If you run out of space, you can replace the Apple devices that you don't plan to own. Here's how:

1. Select option 3, Edit the Device List, from the Configure the Serial Ports Menu.
2. Highlight the line you want to replace and press **(RETURN)**. You see a new screen and this message:

**Enter New Device Name:**

.....

3. Type a name for your device and press **(RETURN)**.

4. You are asked if you know the device's PIN.
5. If you know the PIN, answer *Yes* by pressing **(RETURN)**. Then type the number. You are asked if the PIN is correct. If you answer *Yes*, you see a new device list with your device's name and PIN.

If you don't know the PIN, select *No* and press **(RETURN)**, then choose the options that describe your device. (If you don't know which option to pick, accept the default by pressing **(RETURN)**.) When you finish supplying the information, you see a screen, like Figure 4-4, that summarizes the information you supplied and displays the PIN. If the information is correct, answer *Yes* by pressing **(RETURN)**.

Figure 4-4. Checking the Parts of the PIN

```
Set Port 1
ESC: Configure the Serial Ports

Printer Mode
8 Data Bits / 2 Stop Bits
1200 Bits per Second
No Parity
Do Not Echo Output on Screen
Insert LF After CR
Insert CR After 80 Characters

The PIN is 163/1124

Is this information correct?
<YES> No

Type Y for Yes or N for No, or press ←
or → to change. Then press RETURN.

For Help: Press ␣-? or ␣-?
```



6. Then you are asked if you want to save the configuration on your utilities disk. If you answer *Yes* by pressing **(RETURN)**, the revised device list is copied onto your copy of the utilities disk so that you can use the information later.

Once all your devices are on the list, it's easy to swap port configurations. Here's how:

1. Start up your utilities disk.
2. Choose option 8, Advanced Operations, from the Main Menu.
3. Choose option 5, Configure the Serial Ports.
4. Choose the port you want to configure.
5. Choose the device you want to use.
6. Start up your application by putting the program disk in the built-in disk drive and holding down **(C)** while you press **(CONTROL)-(RESET)**.

## Glossary

**accessory:** Another word for **peripheral device**—something you attach to the computer (like a printer or a joystick) to make it a more powerful or playful machine.

**Apple II:** A family of computers. The granddaddy of the family, the Apple I, was invented in a garage in California. The newest and most compact addition is the Apple IIc, a transportable Apple II.

**Applesoft BASIC:** The Apple II dialect of the BASIC programming language. See **BASIC**.

**application software:** Programs designed for a particular purpose (such as home finance, education, word processing).

**backup:** A copy of a disk. (It's a good idea to make backup copies of all your important disks and use the backup.)

**BASIC:** Short for **Beginners All-purpose Symbolic Instruction Code**. The most popular computer language for personal computers. It's built into your Apple IIc.

**baud:** A designation for how fast peripheral devices can receive and/or send data.

**bit:** The smallest item of useful information a computer can handle. Usually represented as a one or a zero. Eight bits equals one byte.

**boot:** Another way to say **start up**.

**bug:** An error. The expression comes from the early days of computing when a moth flew into a room-size computer and caused a breakdown.

**byte:** A sequence of eight bits that represent an instruction, a letter, a number, or a punctuation mark.

**carriage return:** The event that occurs when the print head reaches the end of a line and returns to the start of the line.

**catalog:** A list of all the files on a disk. Sometimes called a **directory**.

**chip:** A small wafer containing thousands of microscopic components.

**circuit board:** A collection of integrated circuits (chips) on a board.

**command:** A word or character that causes the computer to do something.

**compiler:** A computer program that translates a language, such as Pascal, into a language the computer can understand. A compiler translates the entire program just once. Compare **interpreter**.

**computer:** A machine that processes words and numbers faster than a food processor can slice potatoes. Not particularly creative or intuitive, but very good at repetitious tasks.

**configuration** In the case of *System Utilities*, the way your serial ports are set up.

**contrast knob:** A dial on your video monitor that lets you adjust the brightness on the screen.

**(CONTROL):** A key on the Apple keyboard that when pressed in conjunction with another key makes that other key behave differently. It controls the operation of other keys.

**copy protect:** To prevent duplicating the contents of a disk. Compare **write protect**.

**CR:** See **carriage return**.

**cursor:** A blinking underline, rectangle, or other symbol that marks your place on the screen.

**data:** Information, especially raw or unprocessed information.

**data base:** A type of application program that helps you keep track of lists of information. Makes it easy to recall, update, and cross-reference information. (Also known as **data management**.)

**data bits:** The computer sends and receives information as a string of bits. These are called **data bits**.

**data disk:** A disk containing your work—letters, budgets, pictures, and so on.

**default:** A recommended response to a question in a program. The response will be used by default unless you supply an alternative.

**destination:** The disk you're copying to. Compare **source**.

**device:** Short for **peripheral device**. A machine attached to your computer, such as a printer or a modem.

**directory:** A list of all the files on a disk. Sometimes called **catalog**.

**disk:** A circle of flexible plastic coated with iron oxide (the same sort of thing they make cassette tape out of). You can buy programs prerecorded on disks, and you save your work on blank disks.

**disk controller card:** A circuit board that provides a connection between other models of the Apple II and one or more disk drives. This connection or **interface** is built into the Apple IIc.

**disk drive:** A device that loads information from disks into the memory of the computer and saves information from the memory of the computer onto a disk.

**Disk Use light:** A light that comes on when your disk drive is loading something from or storing something on a disk. When the light is off, it's safe to put disks in and take disks out of the drive. When the light is on, don't open the disk drive.

**display:** A general term to describe what you see on your screen when you're using a computer.

**DOS:** Short for **Disk Operating System**. See **operating system**.

**DOS 3.2:** An early Apple II operating system. DOS stands for **Disk Operating System**; 3.2 is the version number.

**DOS 3.3:** One of three operating systems used by the Apple IIc. DOS stands for **Disk Operating System**; 3.3 is the version number.

**dot matrix printer:** A type of printer that forms characters with patterns of dots.

**Dvorak keyboard:** An alternate keyboard layout, also known as the **simplified keyboard**.



**80-column text card:** A circuit board used in other models of the Apple II to double the number of characters across the screen. This capability is built into the Apple IIc.

**80/40 Column switch:** A switch that controls the number of horizontal columns or characters across your screen. A television can display a maximum of 40 characters across, while a monitor can display 80 characters across the screen.

**envelope:** A paper sleeve that protects disks when they're not in use. Compare *jacket*.

**error message:** The computer's way of alerting you to a failure in the communication process. Often accompanied by a beep.

**file:** A collection of information that you store on a disk (like a program or memo).

**file management:** A general term for copying files, deleting files, and other housekeeping chores involving the contents of disks.

**firmware:** Another name for the programs in ROM (**read-only memory**). It's more permanent than the software in RAM (**random-access memory**)—thus the name.

**flexible disk:** Another name for floppy disk. See *disk*.

**floppy disk:** Disks are called floppy disks or floppies because they're made of flexible plastic.

**format:** To divide a disk into sections where information can be stored. Disks must be formatted before you can save information on them. Also called *initialize*.

**FORTRAN:** Short for FORMula TRANslator. A computer language used mainly for scientific applications.

**graphics:** A fancy word for computer pictures.

**hand controls:** Computer accessories that move creatures and objects in game programs.

**hardware:** Those parts of the computer that you can see and touch. The computer and the machines that attach to it: the disk drive, printer, and other peripheral devices. Compare *software*.

**highlight:** In the case of *System Utilities*, a pair of angled brackets that distinguishes your selections from others in a list.

**initialize:** To prepare a disk so the computer can store information on it. Another word for *format*.

**input/output:** Abbreviated I/O. Refers to the means by which information is sent between the computer and its peripheral devices.

**integrated circuit:** Networks of microfine wire that conduct electrical impulses. They are etched on silicon wafers and embedded in black plastic.

**interactive guide:** Combines book, disks, and the computer for personal instruction.

**interface:** Hardware or software that links the computer to a device.

**interface card:** See **peripheral card**.

**interpreter:** A computer program that translates a language such as BASIC into a language the computer can understand. An interpreter translates the program each time you run the program. Compare **compiler**.

**jacket:** A square of plastic that protects a flexible disk. You don't remove the jacket (and expect to ever use the disk again). Compare **envelope**.

**joystick:** An accessory that moves creatures and objects in game programs.

**K:** Short for kilobyte. It's how computer memory is measured. The Apple IIc has 128K of RAM (random-access memory) and 16K of ROM (read-only memory). One K is equal to 1024 bytes.

**keyboard:** Your way of communicating with the computer. It looks like the keyboard on a typewriter, but programmers can make the keys do anything they want them to.

**Keyboard switch:** A switch above the keyboard that allows you to use the alternate character set for the Dvorak, or simplified, keyboard layout.

**label:** A strip of paper you stick on a flexible disk to identify it. The label is a good place to put your thumb when you pick up your disks.

**LF:** See **line feed**.

**line feed:** Act of advancing to the next line.

**line width:** Number of characters that fit on one line on the screen or on a page.

**load:** To put data or programs into the computer from a disk.

**logic board:** See **main logic board**.

**Logo:** A computer language that encourages learning through discovery. Easy and fun to learn, but powerful enough for serious application programming.

**main logic board:** A large circuit board that holds RAM, ROM, the microprocessor, custom-integrated circuits, and other components that make the computer a computer.

**memory:** Integrated circuits (chips) that store instructions for the microprocessor (the brain) of the computer. There are two kinds of memory: temporary memory (called RAM) and permanent memory (called ROM). RAM, or random-access memory, depends on electricity, and when the power goes off, it goes away. ROM, or read-only memory, does not.

**menu:** A list of choices.

**microprocessor:** The brain of the computer. The Apple IIc has a 65C02 eight-bit microprocessor.

**mode:** Manner of operating—in the case of *System Utilities*, either printer or communications (modem) mode.



**modem:** Short for **modulator/demodulator**. A device that links your computer to other computers and information services over telephone lines.

**monitor:** It looks like a TV, but it doesn't have channels. It displays instructions from the program to you and shows what you've typed into memory.

**Monitor program:** A built-in program that turns on the disk drive when you turn on the computer.

**mouse:** A pointing device.

**operating system:** A program that, among other things, controls the way information is loaded into memory, the way the computer works with the information, the way information is stored on a disk, and the way the computer talks to printers and other peripheral devices. ProDOS, DOS 3.3, and Pascal are three operating systems available for the Apple IIc.

**oval cutout:** An opening in the disk jacket through which the disk drive read-write head accesses the disk.

**parallel:** A way of sending data eight bits at a time. Compare **serial**.

**parity:** A bit used to check for errors during data transmission.

**Pascal:** A programming language taught in high school and college computer science courses because it stresses a systematic approach to problem solving.

**pathname:** The full name of a file. A pathname begins with the disk (volume) name, then lists any subdirectory names, and ends with the filename. Each part of the name is separated by a slash (/).

**peripheral card:** A circuit board you plug into other models of the Apple II to link the computer to a peripheral device. The interfaces for most popular peripheral devices are built into the Apple IIc.

**peripheral device:** A device that is connected to the computer, like a printer or a modem.

**PIN:** See **product identification number**.

**plotter:** A device that prints charts and graphs.

**port:** A connector on the back of the Apple IIc where you attach printers, hand controls, and other devices to your computer.

**prefix:** The first part of a pathname stored in memory.

**ProDOS:** The primary operating system for the Apple IIc.

**product identification number:** A seven-digit number that describes a device's characteristics, such as baud rate, used to configure the serial ports on the Apple IIc.

**prompt:** A message on the screen.

**Power light:** A light that tells you whether the machine is turned on or not.

**power supply:** A box that draws electrical power out of the power outlet and converts it to power the computer can use to do its computing.

**Power switch:** A rocker switch on the back of the computer that you turn on when you want to use your computer.

**printer:** A device that produces a paper copy of the information you create using the computer.



**program:** (n.) Instructions that tell the computer what to do.  
(v.) To write instructions for the computer—to talk to the computer in terms it understands.

**radio-frequency (RF) modulator:**  
A device that transforms your television set into a computer display device.

**RAM:** See random-access memory.

**random-access memory (RAM):**  
Temporary memory. RAM stores programs and data for the microprocessor.

**read-only memory (ROM):**  
Permanent memory. Applesoft BASIC is stored in ROM.

**ROM:** See read-only memory.

**run:** Something programs do when the computer is carrying out their instructions.

**save:** To store a program or data on a disk (as opposed to storing it in the memory of the computer).

**scroll:** To move all the text on the screen (usually upward) to make room for more text.

**sector:** When disks are formatted, they are divided into tracks and sectors. A sector is part of a track.

**serial:** Things occurring one after another—like soap operas. A serial interface means data is sent one bit at a time. Compare parallel.

**serial port:** Outlet for a peripheral device on the back of the Apple IIc.

**simplified keyboard:** The Dvorak keyboard.

**simulation:** A computerized representation of something in action.

**65C02:** The type of microprocessor (or brain) used in the Apple IIc.

**slots:** Long, narrow connectors inside other models of the Apple II that let you connect printers and other devices to the computer.

**software:** Instructions that tell the computer what to do. They're usually stored on disks. Compare hardware.

**software directory:** A book that lists available software.

**spreadsheet:** A type of application program that simplifies financial planning, cost estimating, and other number-crunching tasks. It is laid out in columns and rows.

**source:** The original—the disk you're copying from. Compare destination.

**stop bits:** One or two bits that indicate the end of a character.

**startup disk:** A disk containing an operating system and a self-starting program.

**store:** To file away for safekeeping. (Something you have to do with data you create using your computer. If you don't store your work on a disk, it will be lost forever when you turn off the computer.)

**subdirectory:** A directory within a directory.

**traces:** Electrical roads that connect the components on a circuit board.

**track:** When disks are formatted, a series of concentric circles are magnetically drawn on the disk. Each of these circles is a track. Compare sector.

**users group:** A computer club where members exchange information.

**utilities:** A set of file and disk management programs.

**volume:** Another word for disk.

**video monitor:** See monitor.

**word processing:** A type of application designed to make writing and editing easier and faster.

**write-enable notch:** A small, square cutout in the upper-right corner of the disk that indicates whether or not information can be recorded on the disk.

**write protect:** To prevent accidental changes to the contents of a disk by covering the write-enable notch. Compare copy protect.

**write-protect tab:** A piece of tape that you can use to cover the write-enable notch on a disk so information can't be recorded on it.

# Index

References to page numbers in  
*System Utilities* appear in brackets  
[ ].

## A

accessories 2  
addition 55  
Advanced Operations Menu [24]  
*An Introduction* disk 5, 9-10  
    review of 11  
    startup display 7  
Apple I 95  
Apple II family differences 104-105  
Apple IIc 3 *See also* computer  
    adding peripheral devices to 79  
    care of 4-5  
    compared to typewriter 42  
    compatibility with other  
        computers 90  
    features 106  
    how it works 40-49  
    innards 38, 39  
    insuring 115  
    major parts of 2  
    opening up 93  
    peripherals 2  
    power consumption 19, 92-93  
    restarting 18  
    specifications 110-111  
    starting up 17  
    turning off 19  
    turning on 6  
*The Apple at Play* disk 20-21  
Apple 21 21  
Apple Access II 33, 86  
*The Apple at Work* disk 28  
Apple Color Plotter 85

Apple Core, International 79  
Apple Logo 54  
Apple lore 94-95  
Apple users group 79, 90  
AppleCare 114, 115  
Applesoft BASIC 54, [18]  
Appleworks 29  
application program disk 85  
application programs 28-36, 47-48  
arithmetic functions 55  
arrow keys 10, 43

## B

backing up disks 45  
backup copies of disks 45, 90, [2, 5]  
bad disks [26]  
banking at home 35  
BASIC 53, 54  
    adding lines in 58  
    books about 55  
    cataloging 62  
    correcting lines in 58  
    deleting lines in 58, 62  
    formatting in 62  
    getting into the programming  
        environment 55, 56  
    getting your program onto a disk  
        62  
    inserting lines 58  
    learning more 55  
    LET statement and 61  
    loading 62  
    reserved words in 60  
    retrieving a program 62  
    saving a program 62-63  
    variables in 59  
BASIC.SYSTEM 66

baud rate 86, [31]  
Beginners All-purpose Symbolic  
    Instruction Code *See* BASIC  
bits 74, [32]  
bits per second (BPS) 86, [32]  
blank disks 22, 23, 45, [21]  
    type to buy [3]  
blinking square cursor 10  
blinking underline cursor 10  
books about computers 79  
booting 40, 91  
BPS (bits per second) 86, [32]  
brightness knob 99  
**BRUN** 101  
budgeting 33, 35  
budgets 32  
bug 74, 91  
built-in disk drive 17  
business presentations 34  
byte(s) 74, 94

## C

calculations 55  
**CAPS LOCK** 100, 107  
card game 21  
care of disks 24  
cassette tape 95  
CAT (ProDOS command) 66  
CATALOG 101  
catalog, typical 102  
cataloging disks 64-65, [23]  
Change a Disk's Format [23, 25]  
changing keyboard layout 15  
characters, unusual 99  
charts 33, 34, 83, 85  
CHECK DISK DRIVE 9  
checking disks [26]  
chips 39



- clearing memory 69
- color, printing in 84
- color monitor 83
- common settings [29, 43]
- communication 33 *See also*
  - modem
- communications mode [31]
- communications programs 86
- compatibility with other computers 90
- compound interest program 54
- computer 3 *See also* Apple IIc
  - adding pieces to your system 79-80
  - as calculator 56
  - books 79
  - clubs 79
  - graphics 83
  - how it works 38
  - major parts of 2
  - library 33, 86
  - loading programs into 4
  - magazines 79
  - memory 39
  - problems with 98
  - turning off 19
- configuring the serial ports 85, [2, 23, 26, 29, 37]
- contrast 99
- CONTROL** 18
- CONTROL** **RESET** 57
- converting miles to kilometers 68
- copy protection of disks [9]
- copying disks 85, [5]
- cost estimates 35
- crazy sentences 69
- creating a subdirectory [23, 25]
- cursor 10

## D

- damaged disks 90, [26]
- data 41, 48
  - loading 46, 47, 64
  - losing 42, 93
  - retrieving 46, 47
  - saving 42, 64
- data base 29, 31, 33
- data bits [31]
- data disks 46, 85 *See also* disks
  - formatting [2]
- data formats [43]
- data management 31
- debugging programs 71
- defaults [17, 29, 35]
- deferred execution 57
- DELETE** 11, 66
- deleting BASIC programs 62
- deleting characters 10-11
- depreciation 21
- destination disk [6, 14, 20]
- devices 2 *See also* peripheral
  - devices
- directory [25]
- disk(s) 22-25, 92
  - anatomy of 23
  - blank 22, 23, 45, [21]
  - care of 24, 92
  - cataloging 64, [23]
  - changing the format of [26]
  - checking contents of [2]
  - compared to file cabinet 44
  - compared to cassette tape 23
  - containing programs 22
  - copying 85, 87, [2, 3, 9, 21]
  - damaged 90
  - defined 4

- destination [14]
- dividing into sectors 45
- double-sided 23
- duplicating [3, 5]
- enemies of 23
- envelope 10
- erasing files from [2]
- for storing data 22
- formatting 45, 87, [2, 21]
- handling 5, 23
- holder 49, 92
- identifying [23]
- illustrated 22
- importance of making backup
  - copies 90
- label(ing) 23, 49, 92, [9]
- putting in a disk drive 5, 23
- renaming [20]
- rules for naming [17]
- saving a file on 46, [2]
- size 22
- source [14]
- taking out of disk drive 25
- two-sided 8, 92
  - type to buy [3]
- use light 6, 14, 25
  - what it's made of 23
- disk drive 2
  - compared to tape recorder 4
  - second 92
  - selecting [14]
  - whirring sound from 6
- display device 2, 81 *See also*
  - monitor
- problems with 99
- opening the door 5
- operating instructions 5
- problems with 98

division 55  
 DOS 90  
 DOS 3.1 90  
 DOS 3.2 90  
 DOS 3.3 48, 49, [2]  
 DOS 3.3 *System Master* [3]  
 dot matrix printer 84  
 double-sided disks 8  
 Ⓡ 11  
 drawings 33-34  
 drive 1 106  
 drive 2 107  
 duplicate files [20]  
 duplicating disk(s) [3, 5, 21]  
 Dvorak keyboard 15-16

**E**

echo [33]  
 education 32, 34  
 educational software 75  
 80 characters per line 14, 81  
 80 columns 72, 83, 94, 106, [5]  
 80/40 column switch 6, 14, 83, 99  
 electricity 92  
 END statement 58  
 envelopes 10, 24, 92  
 erasing characters 10-11  
 erasing programs 66  
 ergonomics 94  
 error checking 91, [31]  
 error messages 100  
 escape [17]  
 execution, deferred or immediate 57  
 Exit System Utilities [18]  
*Exploring Apple Logo* disk 53  
 eye strain 94

## F

filename rules 46  
 filenames 64  
 files [2]  
   compared to folder 44  
   copying individual [2]  
   deleting [20]  
   duplicating [20]  
 erasing [2]  
   locking and unlocking [20]  
   renaming [20]  
   rules for naming [17]  
 financial planning 35  
 financial statements 32  
 financial tools 21  
 5 1/4 inch disks [3]  
 flexible (floppy) disks [3]  
 formatting 62  
 formatting disks 45, [2, 21]  
 40 characters per line 14, 81  
 40 columns 72, 83, 94  
 full duplex [33]  
 fun 33

## G

games 33, 34, 86  
 garbage [28, 41, 43]  
*Getting Down to BASIC* disk 53, 55, 62-63, 67, 69  
 getting help [12]  
 going further 87  
 graphics 33, 34, 53, 85  
 graphs 33, 34, 83, 85  
 green switch 6

## H

half duplex [33]  
 hand controls 86  
 handle 2  
 Hands on 9, 28  
   *The Apple at Play* 20  
   *Exploring Apple Logo* 54  
   *Getting Down to BASIC* 55  
   *The Inside Story* 38  
 hardware 4  
 help 9-10, 100  
 help messages [13]  
 home finance 33, 35

## I

**I/O ERROR** 4, 9  
 ICs (integrated circuits) 39  
 identifying a disk [23]  
 Imagewriter printer 84  
 immediate execution 57  
 income taxes 35  
 information 40-41  
   creating cross references 31  
   retrieving 40  
   saving 40  
   services 33, [33]  
   storing 22  
 input device 4  
 INPUT statements 59, 61, 69  
*The Inside Story* disk 38  
 integrated circuits 39  
 interest rates 21  
 interface 40  
 International Apple Core 79  
 inventories 31


## J

joystick 86

## K

K (kilobyte) 94  
keyboard 11, 107  
    compared to typewriter 11  
    Dvorak 16  
    illustrated 12-13, 16  
    layout 15  
    simplified 16  
    special keys 12  
    standard 15  
    switch 15  
kilobyte 94

## L

labeling disks 5, 24, 49, [9]  
learning 9, 32, 34  
 11  
Lemonade 21  
LET statement 61  
light  
    Disk Use 14  
    Power 14  
line feed [34]  
line number 57  
line width [34]  
LIST command 71  
list files [23]  
listing devices and PINS [30]  
lists 101  
LOAD 66  
loading BASIC programs 62

loading data 46  
    from drive two 64  
loans 21  
lock/unlock files [20]  
Logo 53, 91  
loudness 8



## M

machine language 75  
magazines, computer 90  
main logic board 39  
memory 40, 41, 45, 57, 90, 91  
memory capacity 106  
menu, selecting from [14]  
messages, sending 33  
microprocessor 39  
miles to kilometers, converting 68  
mistakes 98 *See also*  
    troubleshooting  
mode [31]  
modem 33, 86, [28]  
modem ports [26]  
modulator/demodulator *See*  
    modem  
monitor 2, 14, 81, 83, 94  
    blurry 99  
    monochrome 83  
    problems with 98, 99  
    turning on 6  
monitor program 91  
mouse 85  
moving the cursor 10  
multiplication 55  
music 35  
Music Recital 21

## N

naming programs 64  
NEW 69  
notch, write-enable 23  
number crunching 32  
numeric variables 59

## O

128K 94  
 **CONTROL** **RESET** 18, 19, 101  
 **?** [12-13]  
operating systems 40, 48-49, 90, 91, [21]  
output device 4  
oval cutout 23

## P

paper copy 84  
parallel printers 84  
parity [31]  
Pascal 48, 90, 91, [3]  
Pascal Filer [3]  
pathname [25]  
    selecting by [14]  
peripheral devices 2, 40, 79-81,  
    93  
permanent storage 45  
phone 33  
PIN (product identification  
    number) [29, 31]  
place marker *See* cursor  
plotter 85  
port(s) 106  
    configuring [2, 28]  
    modem [26]



power cord 90  
 Power light 6, 14  
 power surges 90, 93  
 power switch 6, 18  
**PR # 0** 72  
**PR # 3** 72  
**PR # 7** 107  
 prefix [25]  
   overriding [25]  
   setting [25]  
 preparing a disk [21]  
 PRINT statement 55, 57  
 Printer Mode [31]  
 printers 84, [26, 28]  
 printing in color 84  
 problems 9-10 *See also*  
   troubleshooting  
   with computer 98  
   with disk drive 98-100  
   with display 99  
   with loading 100  
   with monitor 98, 99  
   with saving 100  
   with sound 99  
   with spacing [41]  
   with text [41]  
 ProDOS 3, 48, 62, 64, 66, 67, 90,  
   [3, 14, 23]  
   commands  
     CAT 66  
     DELETE 66  
     LOAD 66  
     SAVE 86  
   setting the prefix [25]  
 product identification number (PIN)  
   [29, 31]

programs 28, 48  
   debugging 71  
   loading into computer 25  
   naming 64  
   running 64  
   stopping 101  
 programming 52, 91  
   for beginners 53  
   what it can teach you 53  
 programming languages 72-73  
 protecting files [20]

## Q

quick quiz 21  
 quitting 101, [18]

## R

RAM 16, 40, 106  
 rearranging the keyboard 15  
 renaming disks [20]  
 REPT key 107  
 reserved words 60  
**RESET** 18  
 resolution 94  
 restarting the computer 18-19, 40  
 RF modulator 6  
**→** 11  
 ROM 40  
 rules for naming disks and files  
   [17]  
 RUN 101  
 running a program 64

## S


sample programs 67  
 SAVE 66, 69  
 saving a BASIC program 63  
 saving information 44, 90  
 schematics 34  
 Scribe printer 84  
 scrolling 43  
 second disk drive 85, 92  
 sectors 45  
 selecting by pathname [14]  
 selecting files [14]  
 selecting items from a menu [14]  
 selecting the disk drive [14]  
 serial interface 85  
 serial ports  
   configuring 85, [2, 29]  
   setting [37]  
 serial printers 84  
 service 114  
 Set the Prefix [23]  
 setting the prefix (ProDOS only)  
   [25]  
 setting the serial ports [37]  
 setting up ports [28]  
 setting up the printer [26]  
 shoot 'em up 21, 33  
 silicon wafers 39  
 simplified keyboard 15, 16  
 simulation 75  
 single-sided disk 23  
 single-density disks [3]  
 slots 79, 90, 106  
 software 4, 90, 91  
   choosing 78  
 solid square cursor 10  
 sound 8  
   problems with 99

- source disk [6, 14, 20]
- space quarks 2
- spacing, problems with [41]
- special keys 5
- specialty programs 35
- spreadsheet 29, 32
- standard keyboard, illustrated 16
- starting up 17, 18-19, 40, 41, 91, [4]
  - from drive 2 107
  - illustrated 19
  - trouble with 9-10, 107
  - with the power off 17-18
  - with the power on 18
- startup drive 106
- startup program 91
- statistics 34
- stock prices 33
- stock quotes 86
- stop bits [31]
- stopping 19
- storing information 22
- string variables 59
- studying 34
- subdirectories [14, 25]
- subtraction 55
- support 114
- switches 6
  - 80/40 column 14
  - Dvorak 15
  - keyboard 15
- SYNTAX ERROR** 101
- System Utilities* disk 62-63, [2]
  - general instructions [12]
  - how to use [12]
  - Main Menu [4]
  - overview [9]

## T

- telephone 33, 86
- television 6, 14, 81, 94
- test yourself 21
- text, problems with [41]
- thermal transfer printer 84
- traces 39
- translators 74
- trial and error [41]
- trouble 9-10
- troubleshooting 100, [41, 43]
- turning off the computer 19, 101
- turning on the computer 6
- TV *See* television
- two-sided disks 8, 92
- typewriter, Apple IIc compared to 42
- typical catalog 102
- typing 2, 93

## U

- unusual characters 99
-  11
- uppercase letters 100
- users groups 79, 90
- utilities 85, 87, 91, [2, 3-11] *See also* *System Utilities* disk

## V

- variables 59, 60, 61
- Verify That a Disk Is Readable [23, 26]
- video echo [33]
- video monitor 2, 6
- volume 8, 90

## W, X, Y, Z

- warm start 18-19
- warranty 93, 115
- word processing 29, 30, 37
- write-enable notch 23
- write-protect tab 23, [21]
- write-protecting files [20]
- write protection 48
- writing programs 30, 57

## Tell Apple About the Apple IIc

Your Name \_\_\_\_\_

Your Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_

Work Phone \_\_\_\_\_

Home Phone \_\_\_\_\_

Apple uses comments and suggestions from Apple computer owners like you to improve existing products and develop new and better products. Now that you've used this product, we want to know your suggestions and thoughts about your experience. Please use this form to tell Apple what you think.

**Your Dealer Can Help:** Apple can't respond to your individual questions. If you have a question, would like help, or need service, please contact your Apple dealer.

### Part 1: Tell Apple About You

1. How much prior experience have you had using computers?

☐ None ☐ Little ☐ Moderate ☐ Extensive

2. What computers have you used? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

3. Where do you use your Apple computer? Check all that apply.

☐ Home ☐ Work ☐ School Other \_\_\_\_\_

4. How many people in your family/office use your Apple computer?

Adults \_\_\_\_\_ Children \_\_\_\_\_

### Part 2: Tell Apple About Your System

1. Which Apple computer are you using?

☐ Apple II Plus ☐ Apple IIe ☐ Apple IIc

2. How much memory does it have? \_\_\_\_\_ K

3. Date of purchase \_\_\_\_\_

4. Please list any devices attached to your computer; for example, Apple Joystick, Disk Drive IIc, Apple Modem, Imagewriter Printer. Please supply brand names.

\_\_\_\_\_  
\_\_\_\_\_

7. What application programs do you use or plan to use with your Apple computer?

☐ Word Processing ☐ Data Management

☐ Spreadsheet ☐ Education

☐ Games ☐ Communication

☐ Graphics ☐ Other \_\_\_\_\_

8. Please list the products (program, operating system, or language) you use.

Name of Software

Version Number



example, Apple Joystick, Disk Drive IIc, Apple Modem, Imagewriter Printer. Please supply brand names.

5. Are you using a monitor or a television?

☐ Monitor ☐ Television

What kind is it?

☐ Black and White ☐ Color ☐ Other

Brand Name \_\_\_\_\_

6. Do you plan to write computer programs? ☐ Yes ☐ No

If yes, which programming language(s) will you use?

8. Please list the products (program, operating system, or language) you use.

Name of Software

Version Number

9. Please give us any suggestions or comments and tell us about any problems you've had with your Apple computer. (Feel free to attach additional sheets.)

### Part 3: Tell Apple About This Product

Please take a few minutes to tell Apple what you thought of the manual and where you plan to go from here.

1. What did you like best about the manual?

2. What did you like least about the manual?

3. Which topics, if any, were confusing to you?

4. Did you read the manual from cover to cover?

☐ Yes ☐ No If no, which topics did you skip?

5. Was the information presented appropriately for your level of computer expertise?

☐ Too Elementary ☐ Just Right ☐ Too Complex

6. Please describe specific problems you encountered in the manual. (Page numbers would be helpful. Feel free to attach additional sheets.)

7. Overall, how would you rate this product?

Low

High

1 2 3 4 5 6 7 8 9 10

Thank you for your time and effort.

030-1123



Apple Computer, Inc.  
20525 Mariani Avenue  
Cupertino, California 95014  
408 996-1010  
TLX 171-576

030-1030-A  
©1984 Apple Computer, Inc.  
Printed in U.S.A.